SECTION 1

OVERALL MACHINE INFORMATION

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SPECIFICATIONS

Configuration:	Desk top	
Copying Process:	Dry electrostatic transfer system	
Original:	Sheet/book	
Original Size:	Maximum A3 (11" x 17")	
Copy Paper Size:	Maximum A3 (11" x 17") Minimum A6 (5 1/2" x 9 1/2")	
Copy Paper Weight:	Cassette feed Manual feed	52 to 128 g/m^2 (14 lb to 34 lb) 52 to 157 g/m^2 (14 lb to 42 lb)

Reproduction Ratios: See the following table:

	A4 Version	Letter Version
Enlargement	1:1.41 1:1.22 1:1.15	1:1.55 1:1.29 1:1.21
Full Size	1:1	1:1
Reduction	1:0.93 1:0.82 1:0.71 1:0.65	1:0.93 1:0.77 1:0.74 1:0.65

Zoom: From 65% to 155% in 1% steps

Reproduction Ratio Change: Full size - Enlargement or
Full size - Reduction in less than 5 seconds

Enlargement - Reduction or
Reduction - Enlargement in less than 6.5 seconds

Copying Speed:

The copy speed (in copies per minute) is shown in the following tables:

A4 Version					
A3	B4	A4	B5	A4R	B5R
14	17	26	26	19	19

Letter Version			
LDG	LG	LT	LT(R)
14	17	26	19

When used with a document feeder, A4 (LT) speed is 18 cpm (sideways) when using the 1st or 2nd feed station.

First Copy Time:

6.0 seconds (A4 or 8 1/2" x 11 "), 9.5 seconds when the APS mode is selected: A4 or 8 1/2" x 11")

Warm-up Time:

Approximately 100 seconds (23C)

Copy Number Input:

Numeral keys, 1 to 999, (count up or count down)

Special Functions:

Edit Image (Erase Edge/Erase Center/Save Area/Delete Area modes)
Auto size magnification mode
2 single copies mode
Auto paper select and auto reduce/enlarge mode

Manual Image Density Selection:

7 Steps (Development bias variable)

Automatic Reset:

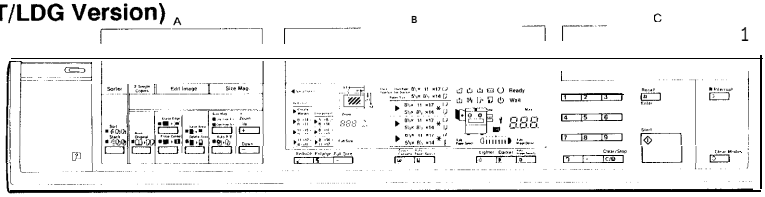
1 min. standard setting; can also be set to 3 min. or no auto reset.
All functions canceled except cassette selection. Quantity entered returns to"1", and reproduction ratio returns to full size.

Paper Feed:	- Triple universal cassette feed, 250 sheets each (auto cassette shift) - Manual feed table - Optional large capacity tray (LCT) at second feed station.
Paper Feed System:	Friction-pad system
Exposure System:	Slit exposure, moving optics
Lens:	Through lens, F8, f = 180mm
Light Source:	Halogen lamp (85 V, 250 W)
Photoconductor:	Selenium drum (F type)
Charge System:	Dual wire dc corona
Erase:	LED lamp unit (64 LEDs)
Development System:	Magnetic brush roller
Toner Density Control:	Automatic, direct density sensing
Development Bias System:	Automatic voltage change (The control board monitors the selected image density level, drum temperature, and rest time.)
Toner Replenishment:	Cartridge exchange (300 g/cartridge)
Toner Consumption:	Approx. 7,000 copies/cartridge (A4 7% original)
Cleaning System:	Blade and brush
Quenching System:	Photo-quenching
Image Transfer:	Single wire dc corona, pre-transfer lamp
Paper Separation:	Dual wire ac corona and pick-off pawls
Image Fusing:	Heat/pressure - roller type
Fusing Lamp:	Halogen lamp (840 W)

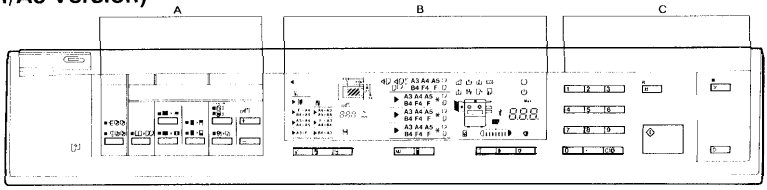
Electronic Control System:	8-bit microprocessor
Copy Tray Capacity:	250 sheets (B4 / 10" x 14") 100 sheets (A3 / 11" x 17")
Self-diagnostics:	20 codes, displayed in the copy counter
Power Source:	110V/60Hz . . .15A 115V/60Hz . ...15A 220V/50Hz . ...8A 220 V/60Hz.. . .8A 240V/50Hz. . . .8A
Power Consumption:	Warm-up: 1.0 kW Stand-by: 0.08 kW Copying: 0.42 kW (A4 sideways) Maximum: 1.2 kW
Dimensions: (W x D xH)	Copier only: 734 x 654 x 423 mm 28.9 x 25,8 x 16.7 inches Full System: l,418 x 654 x 518 mm 55.9 x 25.8 x 20.4 inches
Weight:	1 10/115 version (Copier only) Approximately 74.2 Kg (163.6 **lb)** 220/240 version (Copier only) Approximately 75.2 kg (165.8 lb) 110/1 15 version (Full system without table) Approximately 110.1 Kg (242.6 lb) 220/240 version (Full system without table) Approximately 111.1 Kg (244.8 lb)
Optional Equipment:	Document Feeder Sorter (20 bins) Large Capacity Tray Editor Board (requires editing eraser lamp) Color Development Unit (Red, Blue, Green)

OPERATION PANEL

(LT/LDG Version)

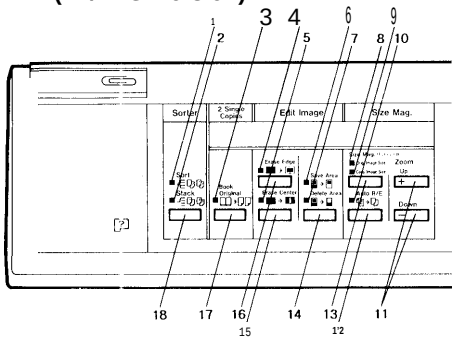


(A4/A3 Version)

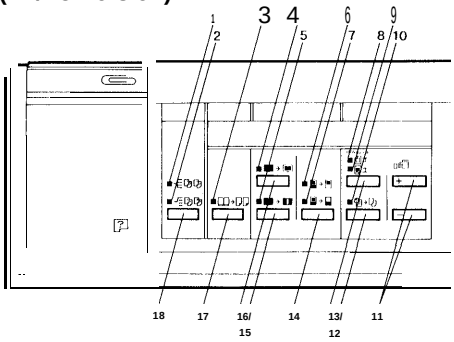


SECTION A

(LT/LDG Version)



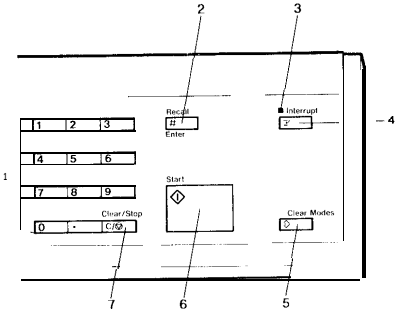
(A4/A3 Version)



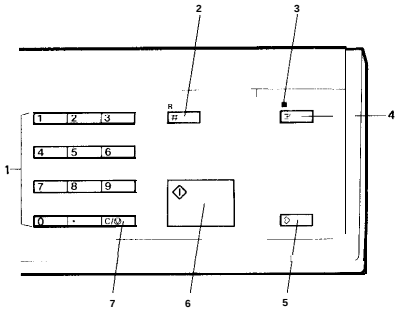
1. Sorter Indicator
2. Stack Indicator
3.2 Single Copies Indicator
4. Erase Edge Indicator
5. Erase Center Indicator
6. Save Area Indicator
7. Delete Area Indicator
8. Original Image Size Indicator
9. Copy Image Size Indicator
10. Auto Reduce/Enlarge Indicator
11. Zoom Keys
12. Auto Reduce/Enlarge Key
13. Size Magnification Key
14. Edit Image Key
15. Erase Center Key
16. Erase Edge Key
17.2 Single Copies Key
18. Sorter Key

SECTION C

(LT/LDG Version)



(A41A3 Version)



1. Number Keys
2. Recall/Enter Key
3. Interrupt Indicator
4. Interrupt Key
5. Clear Modes Key
6. Start Key
7. Clear/Stop Key

COPY PROCESS

1. Drum Charge
In the dark the charge corona unit gives a uniform positive charge to the selenium drum the charge remains on the surface of the drum because the photoconductive selenium has high electrical resistance in the dark.

2. Erase
The erase lamp illuminates the areas of the charged drum surface that will not be used for the copy image. The resistance of the drum in the illuminated areas drops and the charge on those areas dissipates.

3. Exposure
An image of the original is reflected to the drum surface via the optics. The charge on the drum surface is dissipated in direct proportion to the intensity of the reflected light, thus producing an electrical latent image on the drum surface.

4. Development
Negatively charged toner is attracted to the positively charged areas of the drum, developing the latent image. The negative triboelectric chzarge is caused by rubbing action between the carrier and toner particles.)

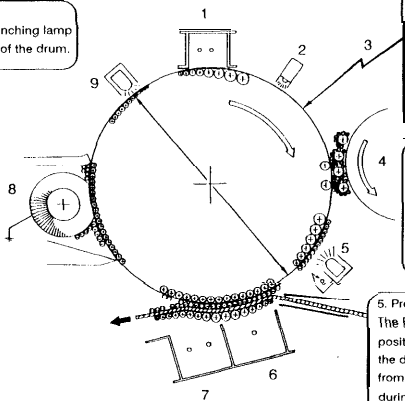
5. Pre-Transfer Lamp (PTL)
The PTL illuminates the drum to remove all positive charge from the exposed areas of the drum. This prevents the toner particles from being reattracted to the drum surface during paper separation and makes paper separation easier.

6. Image Transfer
Paper is fed to the drum surface at the proper time so as to align the copy paper and the developed image on the drum surface. Then, a strong positive charge is applied to the reverse side of the copy paper, providing the electrical force to pull the toner particles from the drum surface to the copy paper. At the same time, the copy paper is electrically attracted to the drum surface.

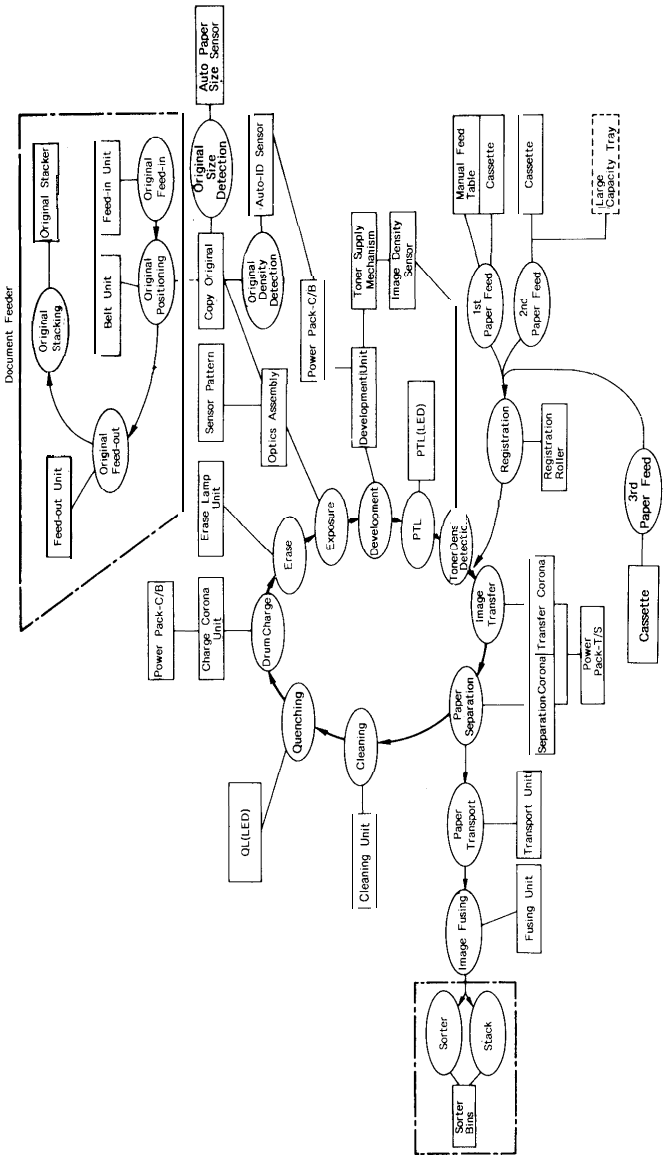
7. Paper Separation
A strong ac corona discharge is applied to the reverse side of the copy paper, gradually reducing the positive charge on the copy paper and breaking the electrical attraction between the paper and the drum. Then, the stiffness of the copy paper causes it to separate from the drum surface. The pick-off pawls help to separate paper which has low stiffness.

8. Cleaning
The cleaning brush removes part of the toner on the drum and loosens the remainder. The cleaning blade then scrapes off the loosened toner.

9. Quenching
The light from the LEDs of the quenching lamp electrically neutralizes the surface of the drum.

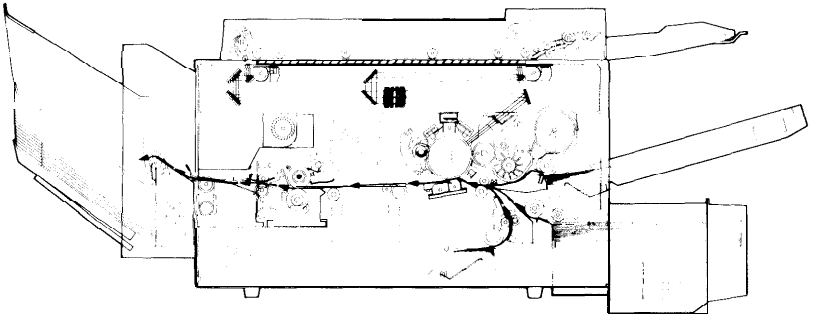


FUNCTIONAL OPERATION



PAPER PATH

Paper feed starts from one of the three paper feed stations; two external cassette and one internal cassette tray. The path followed depends on which cassette the operator has selected. For copy processing, all sheets follow the same path from the paper feed mechanism through the fusing unit. After that, copies are delivered to the receiving tray.



1. Paper Feed

A friction pad and feed roller mechanism separates one sheet of paper from the paper stack and feeds it to the registration rollers. If the paper is fed from the internal cassette tray, the relay rollers move the paper to the registration rollers., The registration rollers are not turning at this time. The paper buckles slightly when the leading edge reaches the registration rollers. Buckling seats the sheet securely between the registration rollers and corrects skew.

2. **Registration**

At the programmed time, the registration rollers start turning to feed the paper to the drum.

3. **Image Transfer**

The toner image on the drum surface is pulled from the drum onto the passing paper by the transfer corona.

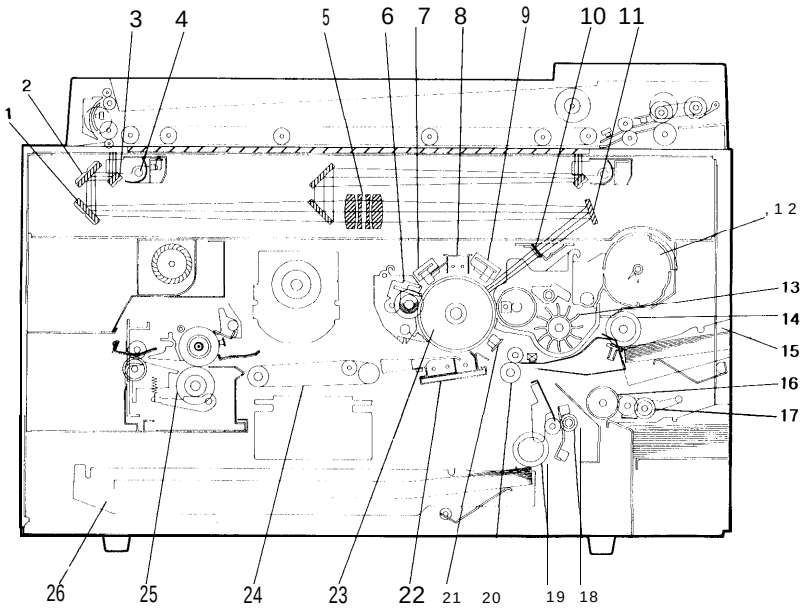
4. **Paper Separation**

The separation corona breaks the electrostatic attraction between the paper and the drum. The suction of the vacuum fan pulls the paper onto the transport belt. The transport belt moves the paper with the developed copy image to the fusing unit.

5. **Fusing**

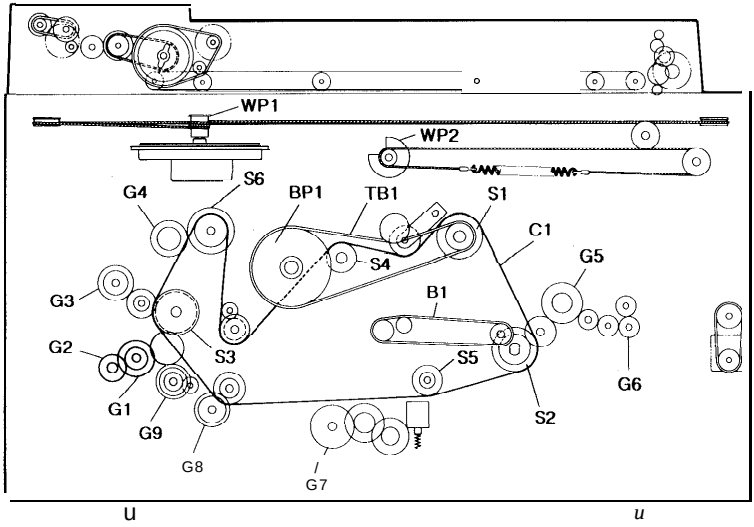
The paper passes between two rollers which bond the toner image to the paper by applying heat and pressure. At this point the copy is complete.

MECHANICAL COMPONENT LAYOUT



1. Third Mirror
2. Second Mirror
3. First Mirror
4. Exposure Lamp
5. Lens
6. Cleaning Unit
7. Quenching Lamp
8. Charge Corona Unit
9. Erase Lamp Unit
10. Toner Shield Glass
11. Fourth Mirror
12. Toner Cartridge
13. Development Unit
14. First Feed Roller
15. First Cassette
16. Second Feed Roller
17. Pick-up Roller (LCT)
18. Relay Roller
19. Third Feed Roller
20. Registartion Roller
21. Pre-Transfer Lamp (PRL)/Image Density Sensor Board
22. Transfer/Separation Corona Unit
23. Selenium Drum
24. Transport Belt
25. Fusing Unit
26. Third Cassette

DRIVE LAYOUT



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Gears

G1 Second Feed Clutch Gear
G2 Pick-up Roller Drive Gear(LCT)
G3 First Feed Clutch Gear
G4 Toner Supply Clutch Gear
G5 Hot Roller Drive Gear
G6 Exit Roller Drive Gear
G7 Third Feed Cassette Lift Gear
G8 Third Feed Clutch Geer
G9 Relay Clutch Gear

Sprockets

S1 Main Motor Sprocket
S2 Fusing Drive Sprocket
S3 Feed Drive Sprocket
S4 Cleaning Drive Sprocket
S5 Toner Collection Bottle Drive Sprocket
S6 Development Drive Sprocket

Wire Pulleys

WP1 Scanner Drive Pulley
WP2 Second Scanner Drive Pulley

Timing Belt

TBI Drum Drive Belt

Belt

B1 Transport Belt

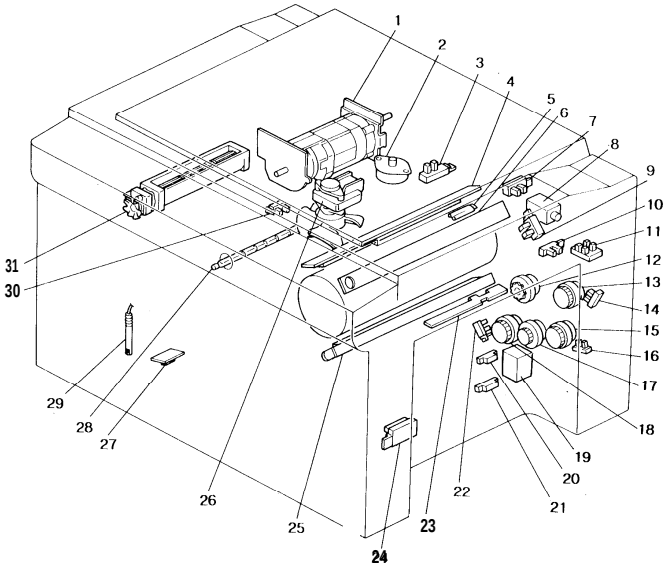
Belt Pulley

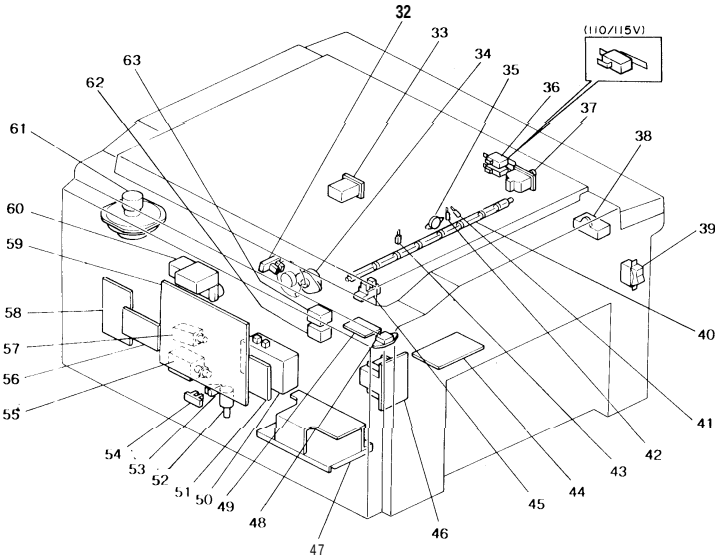
BPI Drum Drive Pulley

Chains

Cl Main Drive Chain

ELECTRICAL COMPONENT LAYOUT





1. Main Motor - Ml
2. Lens Drive Motor - M2
3. Lens HP Sensor - S1
4. Quenching Lamp - L1
5. Drum Heater
6. Erase Lamp - L2
7. Pulse Generator Sensor - S2
8. Toner Supply Solenoid - SOL1
9. Color Toner End Sensor - S3
10. Manual Feed Sensor - S4
11. Color Toner Sensors - S5
12. Registration MC - MCI
13. First Paper Feed MC - MC2
14. First Paper End Sensor - S6
15. Second Paper Feed MC - MC3
16. Second Paper End Sensor - S7
17. Relay Feed MC - MC4
18. Third Paper Feed MC - MC5
19. Tray Lock Solenoid - SOL4
20. First Paper Size Sensor - S8
21. Second Paper Size Sensor - S9
22. Third Paper End Sensor - S16
23. Registration Sensor - S1 O
24. Third Paper Size Sensor - S17
25. Pre Transfer Lamp - L3
26. Vacuum Fan Motor - M3
27. Toner Overflow Sensor - S14
28. Fusing Lamp - L4
29. Oil End Sensor - S15
30. Paper Exit Sensor - S11
31. Exhaust Blower Motor - M4
32. Second Scanner Home Position Sensor - S12
33. Total Counter - CO1
34. Second Scanner Motor - M5
35. Thermostat - **TH1**
36. Door Switches - SW4
37. Front Cover Safety Switches - SW2 and 3
38. Main Motor Capacitor - C
39. Main Switch - SW1
40. Exposure Lamp - L5
41. AD (Auto Density) Sensor - S18
42. OL (Original Length) Sensor - S19
43. OW (Original Width) Sensor - S20
44. Relay PCB - PCB2
45. Scanner Home Position Sensor - **S13**
46. Transformer - TR1
47. DC Power Supply Unit - PSU
48. Fusing Triac - FT
49. Heater Control PCB - PCB5
50. Power Pack - T/S - P1
51. Interface Board - PCB3
52. Cassette Tray Lift Motor - M7
53. Cassette Tray Lift Sensor - S21
54. Cassette Tray Sensor - S22
55. Cleaning Solenoid - SOL2
56. Lamp Regulator PCB - PCB1
57. Pick-off Solenoid - **SOL3**
58. Feed Control PCB - PCB4
59. Main PCB - PCB6
60. Power Pack - C/B - P2
61. Scanner Drive Motor - M6
62. Power Relay - RA1
63. Main Motor Relay - RA2

ELECTRICAL COMPONENT DESCRIPTIONS

SYMBOL	NAME	FUNCTION	LOCATION
Motors			
MI	Main Motor	Drives all main unit components except the optics unit and fans/blowers. (100 Vat)	1
M2	Lens Drive Motor	Positions the lens. (dc servo)	2
M3	Vacuum Fan Motor	Provides suction so that paper is held firmly on the transport belt. (100 Vat)	26
M4	Exhaust Blower Motor	Removes heat from around the fusing unit. (100 Vat)	31
M5	Second Scanner Motor	Positions the second scanner. (dc stepper)	34
M6	Scanner Drive Motor	Drives the scanner. (dc servo)	61
M7	Cassette Tray Lift Motor	Raises the 3rd cassette bottom piate.	52
Magnetic Clutches			
MCI	Registration MC	Drives the registration rollers.	12
MC2	First Paper Feed MC	Starts paper feed from the first paper feed station.	13
MC3	Second Paper Feed MC	Starts paper feed from the second paper feed station.	15
MC4	Relay Feed MC	Starts transfer of paper from third feed station.	17
MC5	Third Paper Feed MC	Starts paper feed from the third paper feed station.	18
Solenoids			
SOL1	Toner Supply Solenoid	Energizes to supply toner.	8
SOL2	Cleaning Solenoid	Moves the cleaning blade against the drum.	55

SYMBOL	NAME	FUNCTION	LOCATION
SOL3	Pick-off Solenoid	Brings the pick-off pawls into contact with the drum.	57
SOL4	Tray Lock Solenoid	Prevents the cassette tray being pulled out while bottom piate is raised and when making copies from the 3rd feed station and when jam occurs in the cassette tray.	19

Switches

Swl	Main Switch	Supplies power to the copier.	39
SW2 and 3	Front Cover Safety Switches	Cuts ac power to ac components.	37
SW4	Door Switches	Enables the Door Open indicator.	36

Sensors

S1	Lens Home Position Sensor	Informs the CPU when the iens is at the full size position.	3
S2	Pulse Generator Sensor	Supplies timing pulses to the main board.	7
S3	Color Toner End Sensor	Detects when it is time to add toner.	9
S4	Manual Feed Sensor	Detects when the manual feed table is open.	10
S5	Color Toner Sensors	Detects which color toner development unit is Installed.	11
S6	First Paper End Sensor	Informs the CPU when the first cassette runs out of paper.	14
S7	Second Paper End Sensor	informs the CPU when the second cassette runs out of paper.	16
S8	First Paper Size Sensor	Determines what size paper is in the first cassette.	20
S9	Second Paper Size Sensor	Determines what size paper is in the second cassette.	21
S10	Registration Sensor	Misfeed detector and ON/OFF timing.	23
S11	Paper Exit Sensor	Misfeed detector.	30

SYMBOL	NAME	FUNCTION	LOCATION
S12	Second Scanner Home Positlon Sensor	Informs the CPU when the second scanner is at the home position.	32
S13	Scanner Home Position Sensor	Informs the CPU when the scanner is at the home position.	45
S14	Toner Overflow Sensor	Detects when the used toner bottle Is full.	27
S15	Oil End Sensor	Detects low oil condition,	29
S16	Third Paper End Sensor	Informs the CPU when the 3rd cassette runs out of paper.	22
S17	Third Paper Size Sensor	Determines what size paper Is in the third cassette.	24
S18	AD (Auto Density) Sensor	Detects the background density of the original.	41
S19	OL (Original Length) Sensor	Detects the paper size in APS mode.	42
S20	OW (Original Width) Sensor	Detects the paper size in APS mode.	43
S21	Cassette Tray Lift Sensor	Determines when the paper has reached the correct feed position.	53
S22	Cassette Tray Sensor	Detects if the cassette tray is properly set to the original position.	54

Printed Circuit Boards

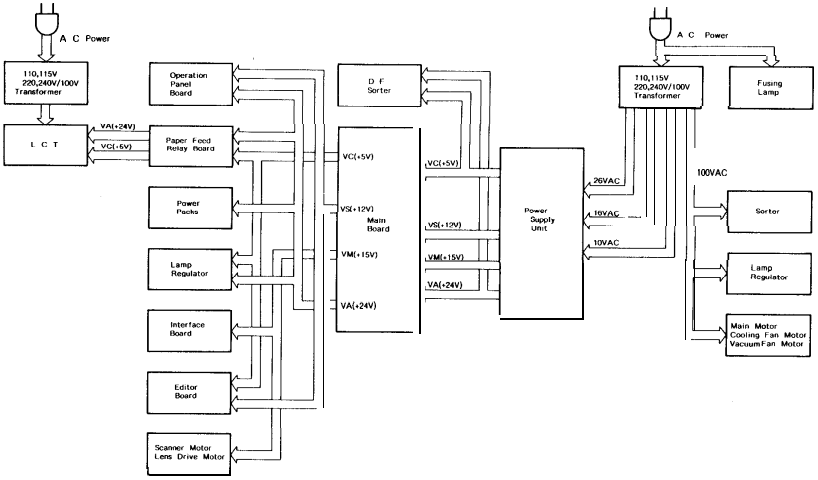
PCB1	Lamp Regulator PCB	Regulates the exposure lamp voltage.	56
PCB2	Relay PCB	Main power relay. Provides 100 volts ac to motors and circuits.	44
PCB3	Interface PCB	Serves as a data interface between the copier main board and the sorter and/or DF main boards.	51
PCB4	Feed Control PCB	Contains multiplexing circuitry to control feed components.	58
PCB5	Heater Control PCB	Controls heater switching.	49
PCB6	Main PCB	Controls all copier functions both directly and through other PCBS.	59

SYMBOL	NAME	FUNCTION	LOCATION
Lamps			
LI	Quenching Lamp	Neutralizes any charge remaining on the drum surface after cleaning.	4
L2	Erase Lamp	Discharges the drum outside the image area. Provides lead/trail edge erase and editing functions.	6
L3	Pre-Transfer Lamp	Reduces charge on the drum surface before transfer.	25
L4	Fusing Lamp	Provides heat to the fusing unit.	28
L5	Exposure Lamp	Applies high intensity light to the original.	40
Power Packs			
PI	Power Pack - T/S	Provides dc voltage for the transfer and provides ac and dc voltage for the separation corona.	50
P2	Power Pack - C/B	Provides high voltage power for the charge corona and the development roller bias.	60
Transformer			
TR1	Transformer	Steps down the wall voltage to 100 Vat.	46
Counter			
CoI	Total Counter	Keeps track of the total number of copies made.	33
Relays			
RA1	Power Relay	Main power relay to fusing lamp and heater control board.	62
RA2	Main Motor Relay	Main power relay to main motor and exposure lamp.	63

Others

SYMBOL	NAME	FUNCTION	LOCATION
C	Main Motor Capacitor	Start capacitor	38
FT	Fusing Triac	Switches the fusing iamp on and off.	48
Psu	DC Power Supply Unit	Rectifies the 100 Vac input and outputs dc voltages.	47
TH1	Thermostat	Opens the exposure lamp circuit if the temperature in the optics cavity becomes higher than 150°C.	35

AC AND DC POWER DISTRIBUTION



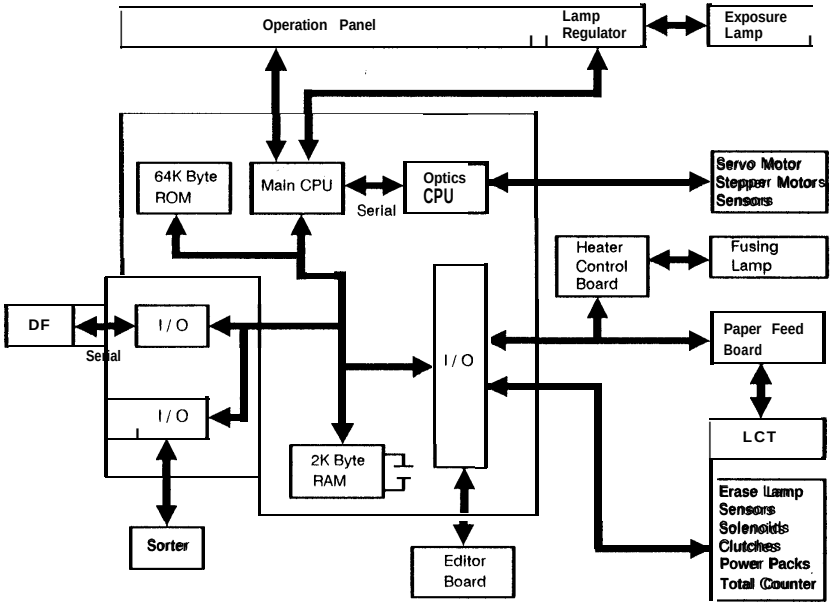
The ac power supply is filtered then distributed to the fusing lamp and the main transformer. The transformer supplies 100 volts to the cooling fan, vacuum fan, and the main motor.

The dc power supply unit receives ac 26, 16, and 10 volts, via fuses, from the main transformer. These voltages are rectified and regulated to 24, 15 and 12, and 5 volts respectively and distributed to the sorter, ADF, and the copier main board. All supplies have their own ground line.

The main board supplies voltage to all copier electrical components including power packs, PCBs, and relays. It also supplies the editor.

The LCT has a separate power supply.

OVERALL MACHINE CONTROL



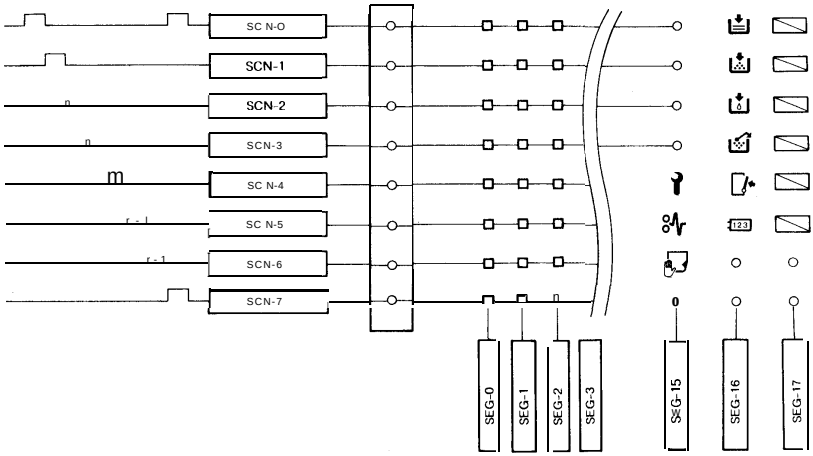
The base copier has two CPUS on the main board that control all machine operations (the main CPU and the optics CPU).

The main CPU is the main controller of this copier. It monitors the input signals from sensors and controls the electrical devices through programmable I/O devices. The main board has a RAM (2 kilobytes) for the service program function. A battery backs up the power to this RAM. This CPU controls the fusing lamp via the heater control board the exposure lamp, via the lamp regulator, and motors directly from the main board.

The optics CPU controls the servomotor (15 volts) and the stepper motors (24 volts) for the optics section.

The interface board is connected to the copier main board when the document feeder and/or sorter are installed.

OPERATION PANEL CONTROL



The CPU controls all functions of the operation panel. The CPU sends data to programmable I/O devices which form a multiplexing circuit consisting of 8 scan lines and 17 segment lines. Transistors drive all the scan lines at 12 volts to reduce effects from noise.

The multiplexing circuit lights all displays and monitors all keys of the operation panel. The door switch is also monitored by this circuit and acts like any other operation panel key. The counters are also controlled by the operation panel multiplexing circuit and act like the operation panel lamps.

SECTION 2

DETAILED SECTION DESCRIPTIONS

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DRUM

SELENIUM DRUM

Selenium has the characteristics of:

1. Being able to accept a high positive electrical charge in the dark. (The electrical resistance of selenium is high in the absence of light.)
2. Dissipating the electrical charge when exposed to light. (The conductivity of selenium is greatly enhanced by exposure to light.)
3. Dissipating an amount of charge in direct proportion to the intensity of the light. That is, where a stronger light illuminates the selenium surface, a smaller voltage remains on the selenium.

The sensitivity of selenium changes slightly with variations in the surface temperature of the drum. (Under cool conditions, the drum may be excessively charged; this will result in background or excessive image density.) To prevent this, the CPU monitors the temperature variations around the drum and changes the development bias accordingly. Also, during cold periods, the drum heater warms the drum.

Drum sensitivity also depends on how long the drum has rested between copy runs. The copier's CPU compensates for changes in drum sensitivity due to rest time by changing the development bias. This prevents variations in image density at the beginning of copy runs.

F-- The selenium drum used in this model has high sensitivity, good color reproduction, and good reproduction of low contrast originals (pencil originals, etc.).

HANDLING THE DRUM

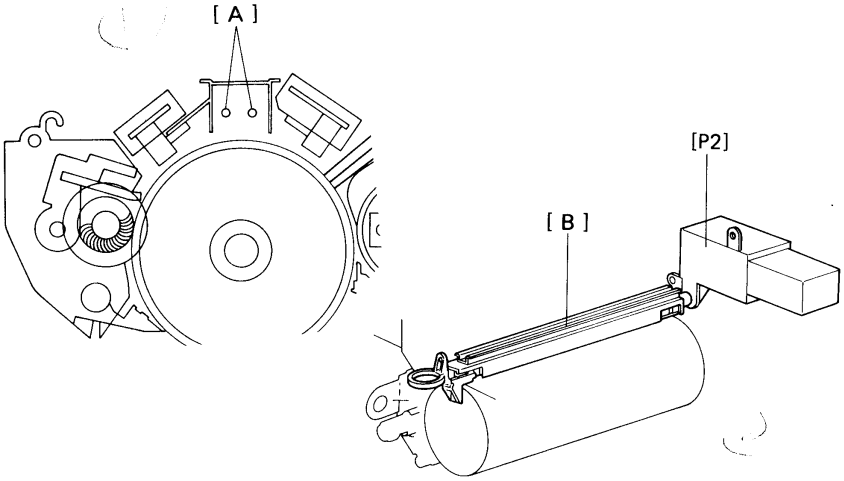
1. Never touch the drum surface with bare hands.
2. Store the drum in a cool dry place away from heat.
3. When cleaning the drum, always wear gloves. Do not throw away cotton used for cleaning. Bring it back to the service depot for disposal according to local regulation.
4. Use only setting powder to prime the drum, when the drum, cleaning blade, and cleaning brush are replaced as a set. Do not take more than one minute to do this, and do not exposure the drum to strong light.
5. Never expose the drum to light for long periods.
6. Drum conditioning is necessary after installing a new drum. In addition, it should be done at the following times:

   1) When image density is reduced due to overexposure of the drum
   2) After cleaning the drum
   3) When the drum is lightly scratched.

7. Always keep the drum in the protective sleeve when inserting or pulling the drum out of the copier.
8. Before inserting or pulling out the drum, pull the cleaning unit out slightly to avoid scratching the drum on the pick-off pawls.
9. Before placing the protective sleeve on the drum while it is in the copier, always take out the development unit. If you install the sleeve while the development unit is in the copier, the edge of the sleeve will scrape developer from the development roller.
10. Return used drums to the distributor according to standard procedure.

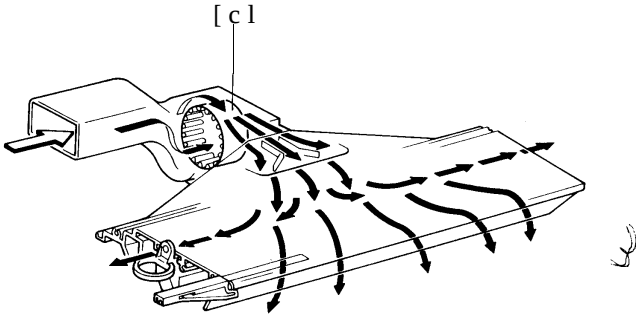
DRUM CHARGE

OVERVIEW

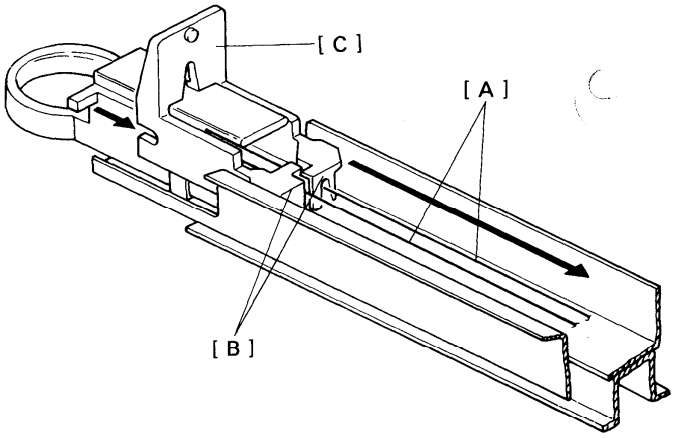


This copier uses a dual wire corotron and a highly sensitive selenium drum. The corona wires [A] generate a corona of positive ions when the charge power pack [P2] applies a high positive voltage. The selenium coating receives a uniform positive charge (750 ± 50 volts) as it rotates past the corona unit [B].

The main motor fan [C] provides a smooth flow of air to the interior of the charge corona unit to prevent uneven build-up of positive ions. (An uneven build up of positive ions could cause uneven image density.)



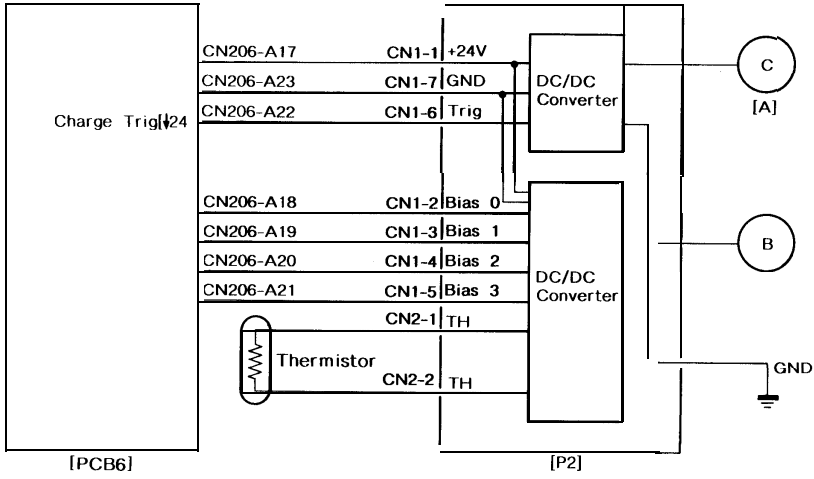
CORONA WIRE CLEANER



The flow of air around the charge corona wires [A] may deposit paper dust or toner particles on the corona wires. These particles may interfere with charging and cause low density bands on copies. The wire cleaner [B] allows the operator to correct this problem by simply pulling out and pushing in the corona unit.

Each corona wire is held between two pads on the wire cleaner bracket [C]. The wires ride between the pads when the unit is pulled out, and the pads clean off any particles on the wires.

CHARGE CORONA POWER PACK



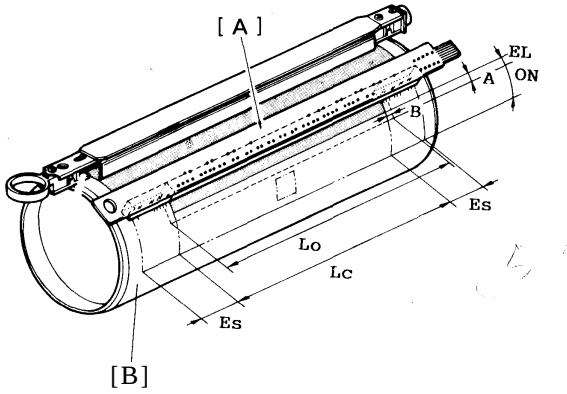
The circuit operation for the charge corona [A] begins with the input of +24 volts to the power pack at CN 1 - 1. This power supply is used for the high voltage coronas.

The charge corona turns on 0.42 second after the Start key is pressed. A LOW signal from the main board (at CN206-A22) energizes the power pack.

The charge corona always turns on at the same time, but the off timing depends on paper size.

ERASE

OVERVIEW



A: Lead Edge Erase Margin
B: Side Margins -- 2 ± 2mm each (For full size copies, the total of both side margins is less than 4 mm.)
Lo: Original Image width
Lc: Charged width on the Drum
EL: Lead Edge Erase
Es: Side Erase
R: Paper Lead Edge Registration --0 ± 2 mm (Not shown)
A+R: Lead Edge Blank Margin --3.5 ± 2.5 mm

The erase lamp [A] consists of a line of LEDs extending across the full width of the drum [B].

The erase lamp has three functions: lead edge erase, side erase, and trail edge erase. Trail edge erase begins after the trailing edge of the copy paper; therefore, the trailing edge of the copy will not be erased.

The erase lamp unit [A] also has two thermistors: TH-1 and TH-2. Both of these thermistors detect the temperature around the drum. TH-1 selects the proper rest time compensation, and TH-2 controls the development bias voltage.

LEAD EDGE ERASE

The entire line of LEDs turns on when the main motor turns on. They stay on until the erase margin slightly overlaps the lead edge of the original image area on the drum (Lead Edge Erase Margin). This prevents the toner density sensor pattern from being developed on every copy cycle and prevents the edge of the original from appearing on the copy image. The width of the lead edge erase margin can be adjusted using SP Mode # 41.

During image density detection cycles (once every ten cycles), the center block of erase lamps turns off long enough for the sensor pattern to be developed.

SIDE ERASE

Based on the paper size and on the reproduction ratio, the LEDs turn on in pairs (one on either side) to discharge the drum potential on both sides. This reduces toner consumption and drum cleaning load.

The CPU adjusts the side erase margin to be as near as possible to the actual image size, even when using the zoom function. However, since the erase lamp LEDs will not work in precise one millimeter intervals, the side erase margin varies slightly depending on the reproduction ratio. The width of the side erase margin varies from O mm to a maximum of 6 mm (total of both sides).

1. Side Erase Operation

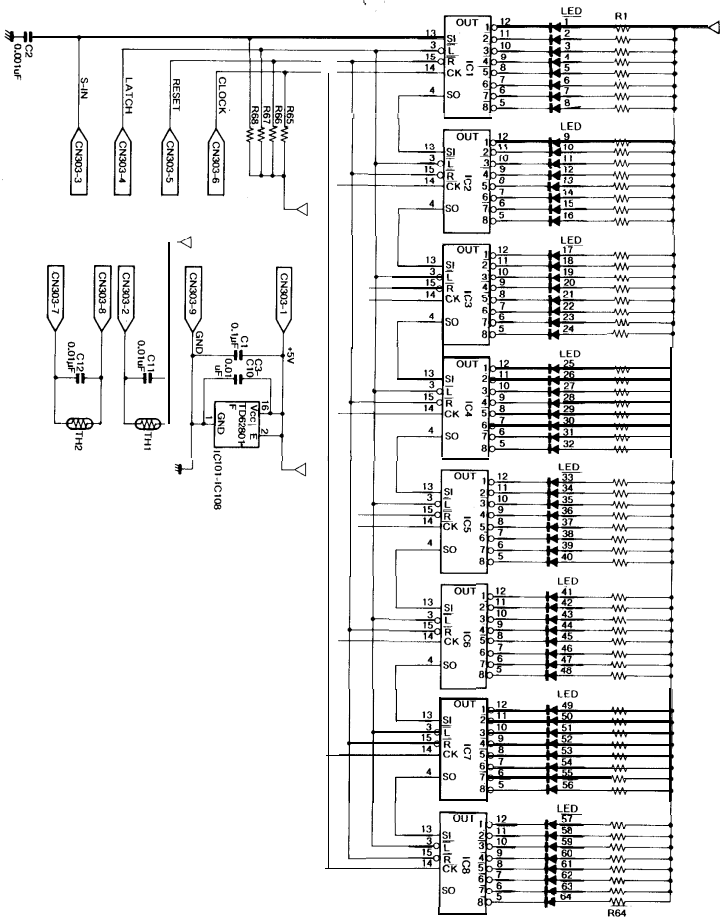
The tables below show which erase lamps turn off, according to the paper size and reproduction ratio selected. Note that A3 side edge erase occurs because the charge corona end block covers stop the edges of the drum from receiving charge.

	OFF LED	Reproduction Ratio	Paper Size	Erase Width(mm)
1	1-64	98-155%	A3 A4 Sidewise	2x2
21	2-63	94-98%		6x2
3	3-62	91 -94%	DLT LT Sidewise	11X2
4	4-61	87-91%		16x2
5	5-60	85-87%	B4	22x2
6	6-59	81 -85%		26x2
7	7-58	78-81 %		30x2
8	8-57	76-78%		34x2
9	9-56	73-76%		38x2
10	10-55	71-73%	LG,F4 LTR,HLT	42x2
11	11-54	69-71%	A4 Lengthwise AS Sidewise	45x2
12	12-53	66-69%	F	49x2
13	13-52	65-66%		55x2
14	14-51	Al I Reproduction Rat io	B5 Lengthwise B6 Sidewise	60x2
15	17-48	All Reproduction Ratio	AS Lengthwise	76x2
16	19-46	All Reproduction Ratio	B6 Lengthwise	86x2
17	22-43	Al I Reproduction Rat io	A6	98x2
18	30-35		ID Sensor Pattern	135x2

TRAIL EDGE ERASE

Normally, the erase lamps turn on after the trailing edge of the latent image has passed. Therefore, a trail edge erase margin cannot be observed on the copy. Trail edge erase ON timing is the same as charge corona OFF timing. During enlargement or reduction, the trail erase ON timing changes according to the paper size and the reproduction ratio.

ERASE LAMP CIRCUIT



This copier uses 64 LEDs in the erase lamp unit. The large number of LEDs allows fine control of the side erase margins as well as the editing functions (Save/Delete).

Shift register drivers control the LEDs. First, the RESET signal (LOW active) turns off all the shift registers, then erase lamp data is sent from CN203-13 on the main board to the shift registers via CN303-3.

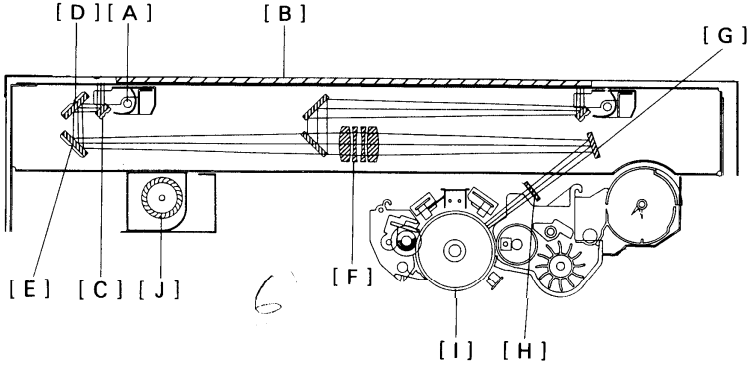
After the RESET signal goes back to HIGH, the shift registers start accepting data. If the data line is HIGH at the time of the CLOCK pulse (rising edge), the shift register is set to turn the LED on; if it is LOW, the shift register is set to keep the LED off. The data in the shift registers is shifted right one position at the start of each clock cycle; so, it takes 64 CLOCK pulses to set the shift registers for all the LEDs.

After all data bits have been sent, the main board sends the LATCH signal to turn on the erase lamp unit. The latch signal causes the shift registers to turn on all LEDs for which data bits have been set to do so.

The center section of LEDs turns on and off as a block, and the outer LEDs turn on and off in pairs.

OPTICS

OVERVIEW



During the copy cycle, an image of the original is reflected onto the drum surface via the optics assembly as follows.

Light Path:

Exposure Lamp [A] --> Original [B] --> First Mirror [C] -->

Second Mirror [D] --> Third Mirror [E] --> Lens [F] -->

Fourth Mirror [G] --> Toner Shield Glass [H] --> Drum [i]

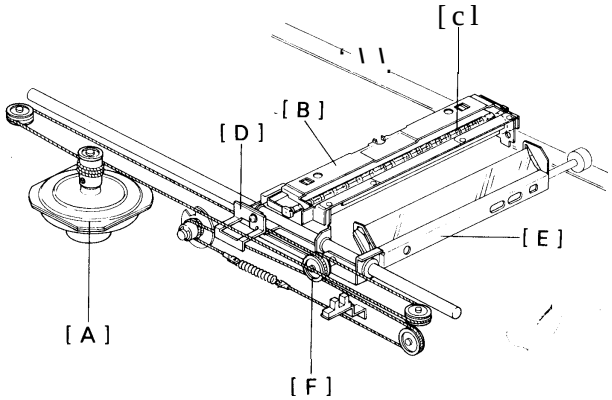
The cooling blower [J] circulates cool air into the optics cavity. The air flows from the right to the left in the optics cavity and exhausts through the vents in the top cover. This blower operates during every copy cycle.

This model has eight standard reproduction ratios: four reduction ratios, three enlargement ratios, and full size. In addition, it has a zoom function, The user can change the reproduction ratio in one percent steps from 65% to 155%.

Stepper motors are used to change the positions of the lens and mirrors. Separate motors are used because of the wide range of reproduction ratios. The scanner drive motor is a servomotor and is controlled by the optics CPU. The scanner drive motor changes the scanner speed depending on the reproduction ratio.

This copier has two special functions: (1) the 2 Single Copies mode, which makes two single copies from a bound document, and (2) the Edit Image mode which can save or delete sections of the image. The Edit Image functions are achieved by turning individual erase lamp LEDs ON/OFF.

SCANNER DRIVE



1. Scanner Drive Mechanism

This model uses a dc servomotor [A] to drive the scanners.

The first scanner [B], which consists of the exposure lamp [C] and the first mirror, is connected to the scanner drive wire by the wire clamp [D]. The second scanner [E], which consists of the second and third mirrors, is connected to the scanner drive wire by a movable pulley (the second scanner

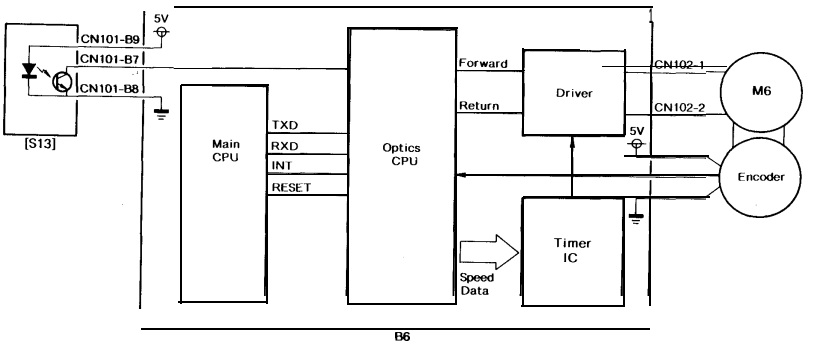
The pulley moves the second scanner at half the velocity of the first scanner. This is to maintain the focal distance between the original and the lens during scanning. This relationship can be expressed as:

$$V1r = 2(V2r) = VD/r$$

where: r = Reproduction ratio
V1r = First scanner velocity (when the reproduction ratio is "r")
V2r = Second scanner velocity (when the reproduction ratio is "r")
VD = Drum peripheral velocity (150 mm/s)

The wire clamp for the first scanner also works as the actuator of the home position sensor. The CPU controls both the registration and return timing.

2. **Scanner Motor Control**



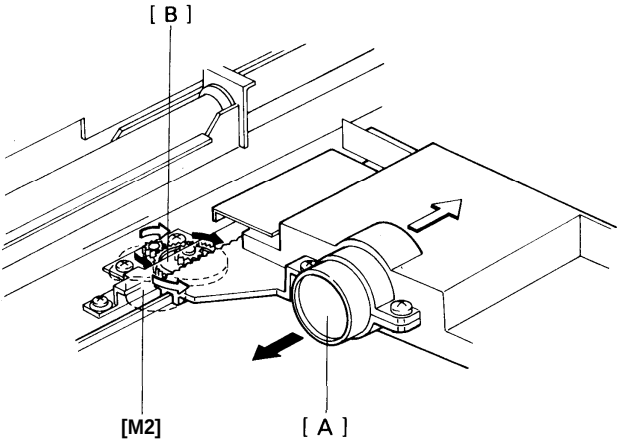
The scanner drive motor [M6] is a servomotor. The optics CPU on the main board [PCB 6] controls the speed of this servomotor. The main CPU and the optics CPU communicate through a serial interface bus.

The optics CPU sends the speed data for the selected reproduction ratio to a timer IC. The timer IC sends the pulse-width-modulation (PWM) signal to the drive circuit, which sends drive pulses to the scanner drive motor.

The encoder on the servomotor has a photointerrupter that generates pulse signals. The optics CPU monitors the scanner speed by these pulse signals and uses this data to regulate the servomotor speed.

The home position sensor [S13] informs the optics CPU whether the first scanner is in the home position.

LENS/MIRROR POSITIONING

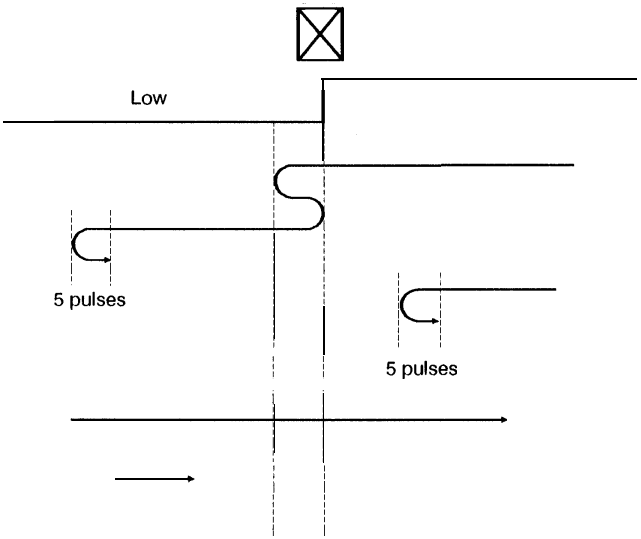


1. Lens Drive

The lens drive motor [M2] (stepper motor) changes the lens [A] position in accordance with the selected reproduction ratio to provide the proper optical distance between the lens and the drum surface.

The lens drive motor drives the entire lens unit through an idle gear [B]. The rotation of the lens drive pulley moves the lens back and forth in discrete steps.

2. **Lens Positioning**

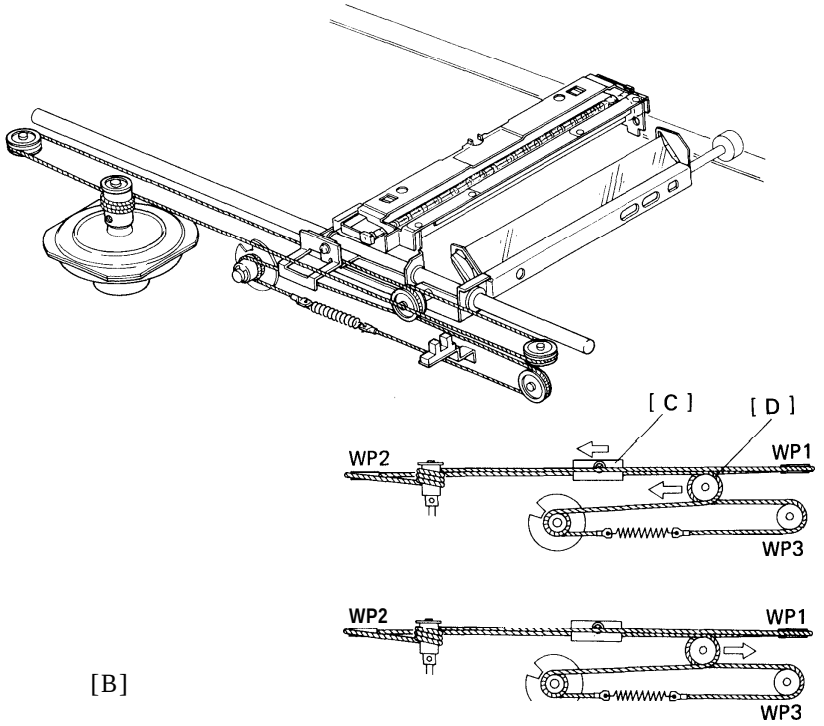


The lens home position sensor [S1] informs the optics CPU when the lens is at the full size position (home position). The optics PCB determines the lens stop position in reduction and enlargement modes by counting the number of steps the motor makes with reference to the lens home position. After changing the reproduction ratio, the lens moves directly to the selected magnification position.

Lens home position is registered each time the lens starts from or passes through the lens home position sensor. As the lens moves from the enlargement side to the reduction side, it registers the home position. At registration there is a LOW to HIGH voltage change at CN101-B3 of the main board. This occurs when the actuator blade enters the lens home position sensor.

A small vibration can be observed when the lens moves through home position from reduction to enlargement because the lens is going in the wrong direction to register. The lens overshoots the home position by only one step before going back to reference home position.

3. **Second Scanner Drive**

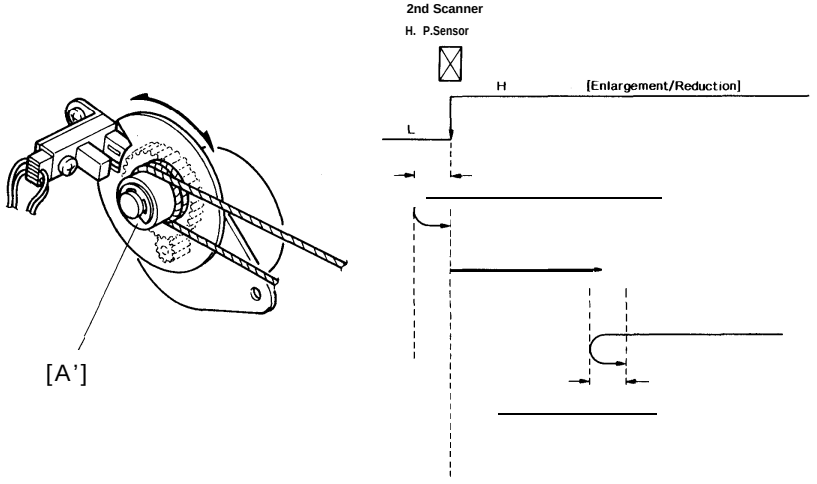


To provide the proper optical distance between the original and the lens, this model uses a stepper motor [A] to move the second scanner. A separate motor is used because the second scanner must travel a long distance to accommodate the wide range of reproduction ratios. The single scanner drive wire provides the second scanner with drive as well as correcting the second scanner position.

When the second scanner drive pulley [B] turns to change the scanner position, WPI and WP2 do not turn. So, the wire clamp [C] stays at the home position and only the second scanner pulley [D] moves. When the scanner drive pulley turns, WP3 does not rotate; however, the second scanner pulley and the wire clamp do move.

As the second drive motor drives the second drive pulley directly, then the second scanner can be positioned manually (for maintenance etc.).

4. Second Scanner Positioning

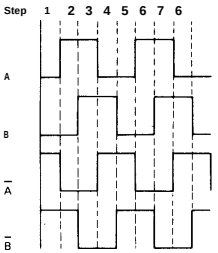


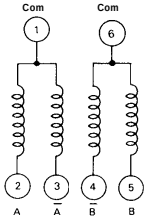
Like the lens, the second scanner is positioned by counting the number of steps from the home position. Second scanner home position is determined by a HIGH to LOW to HIGH change at CN1OI-B4 of the main board.

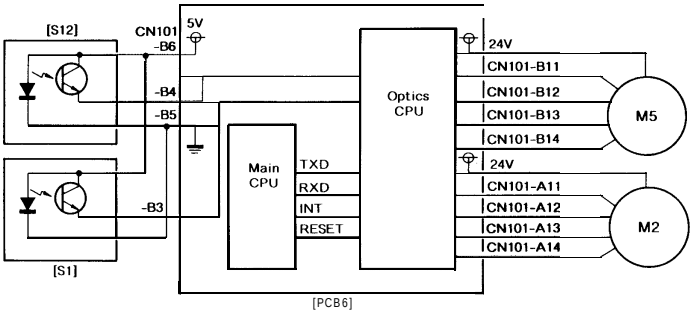
The home position depends on the horizontal magnification set by SP mode #44. After the HIGH to LOW to HIGH change mentioned above, the CPU counts the number of steps until the second scanner reaches the home position.

When moving away from the home position, the second scanner drive pulley [A] turns clockwise and moves the second scanner directly to the selected position. However, when moving closer to the home position (pulley turning counterclockwise), the second scanner overshoots the selected position by 5 steps and then returns to the selected position. This takes out any mechanical play.

STEPPER MOTOR CONTROL



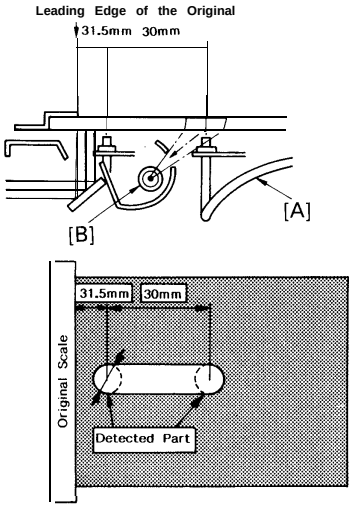


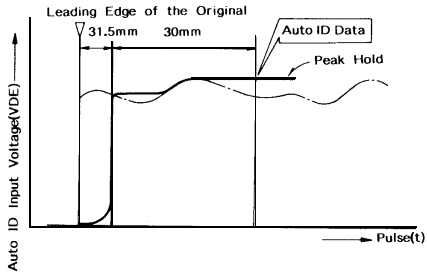


Both the lens drive motor [M2] and the second scanner drive motor [M5] are stepper motors. The stators of these stepper motors have four coils (labeled A, B, A and B above), and the rotors are permanent magnets.

Pulse signals energize the four coils as shown in the above illustration. The rotor turns in discrete steps.

AUTOMATIC IMAGE DENSITY SENSING



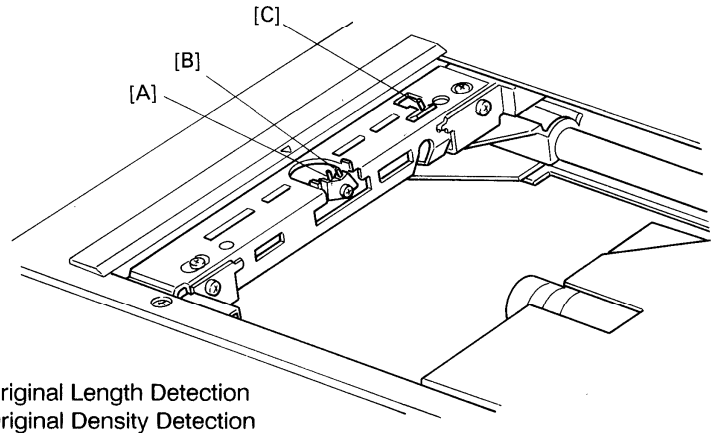


The input for the automatic image density circuit is via a fiber optic cable [A] that is mounted on the first scanner. Light from the exposure lamp [B] passes through a small hole in the reflector, reflects from the original, and is collected by the fiber optic cable. The sampled strip starts 31.5 millimeters from the leading edge of the original and is 8 millimeters wide and 30 millimeters long.

The fiber optic cable conducts the light to a sensor (photodiode) on the lamp regulator. The sensor circuit converts the light intensity to a voltage level. The detected voltage is adjustable via a variable resistor on the lamp regulator board. A peak hold circuit keeps the maximum voltage.

The lamp regulator sends the maximum voltage value to the main board. The CPU then computes the correct image density and adjusts the development bias accordingly. (See the section on image density control for more information.)

ORIGINAL SIZE DETECTION



A. Original Length Detection
B. Original Density Detection
C. Original Width Detection

Auto original detection occurs only when the auto paper select mode is chosen. In APS mode, the scanner scans the original once to calculate its size. Light from the exposure lamp is reflected from the original and collected by the fiber optic cables [A, B, and C]. The optics CPU and the main CPU process the data to select the proper paper size.

Sensor Characteristics

The APS length and width sensors have filters that filter out short wavelength light (yellow). The yellow platen cover mat is detected as near black (0.8 volts). The detection level of white originals is adjusted to 3.0 volts.

The ADS sensor has a detection level of 3 volts for white originals and 2.9 volts for yellow.

Original Length Detection

For the optics CPU to detect the original length, it must differentiate between the yellow platen cover and the beginning of the original. Therefore, original length detection actually occurs during the reverse scan of the original.

- Forward Scan -

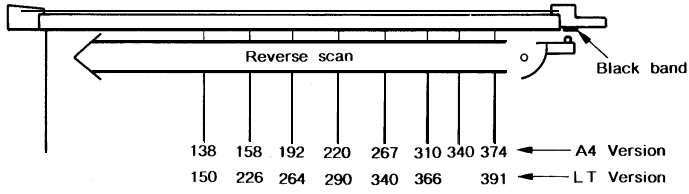
During forward scan, the Auto ID sensor [S19] sends the original density data to the main PCB (CN215). This overall original density value is stored in a RAM for use during reverse scan. Forward scan ends when the black band under the cover next to the right edge of the exposure glass is detected by the sensors.

- Reverse Scan -

When the scanner reverses direction, the optics CPU starts reading the signal from the original length sensor [S18] at CN103 and measures the distance the scanner travels before the edge of the original is detected. This determines the length of the original.

The edge of the original is detected by comparing the light reflected from the yellow area (approximately 0.8 volts) and the original density (measured on the forward scan).

For original size sensing to function properly, the background density of the originals must be lighter than 0.3 on the Kodak scale (Auto ID voltage value greater than 1.0 volt de).



A4 Version

Black band	→	374	A3
374	→	340	B4
340	→	310	F4
310	→	267	A4R
267	→	220	B5R
220	→	192	A4 (A5R)
192	→	158	B5 (B6R)
158	→	138	A5 (A6R)

Letter Version

Black band	→	391	11"x17", 10"x15"
391	→	366	8 1/2"x14"
366	→	340	10"x13"
340	→	290	8 1/2"x11" (L)
290	→	264	8"x10"
264	→	226	8 1/2"x11" (S)
226	→	150	8 1/2"x5 1/2" (S)

All distances are in millimeters and are measured from the left hand scale.

Original Width Detection

Original width data is obtained by the width sensor [S20]. The optics CPU monitors this signal only if the length detection is 220mm or less. If the length is greater than 220mm, the size is determined based on length sensor data only.

SP 57,66

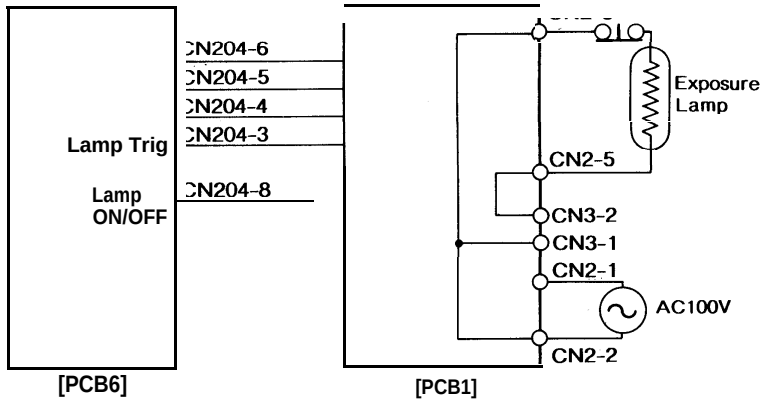
A new function has been added to enable the service engineers to quickly adjust OW/OL sensors.

The OW/OL sensors also have a detction level of 3.0 volts for white paper. If this voltage is incorrect, the APS functions may not work properly and variable resistors for the ADS and OW/OL sensors m, have to be adjusted using SP Modes #56 (ADS) and #57 (OW/OL).

The following new mode is added:

The copier can detect whether an original has been left on the exposure glass by a user, thus preventing originals from jamming inside the DF. This mode can be selected by SP Mode #66.

EXPOSURE LAMP CONTROL



The lamp regulator board controls the exposure lamp. The voltage applied to the exposure lamp is determined by the combination of HIGH and LOW signals at CN204-4, -5, and -6.

The main CPU sends the lamp trigger signal 0.13 second after the registration clutch turns off.

The main CPU constantly monitors CN204-8 to check whether the lamp is on or off. If CN204-8 becomes HIGH when CN204-3 is LOW (lamp ON) or CN204-8 becomes LOW when CN204-3 is HIGH (lamp OFF), the CPU displays SC I 1. RA1 -RA3 open at the same time, cutting the + 24V power line.

The thermostat [A] is located on the first scanner. The function of the thermostat opens the exposure lamp circuit if the temperature around it increases more than 1500C due to a cooling fan and/or scanner malfunction. This prevents heat damage to the exposure glass, left scale, or platen cover.

SERVICE CALL CONDITIONS

Self Diagnostic Code 11:
Exposure Lamp Malfunction
Code 11 is displayed if the lamp monitor voltage is detected during standby (lamp ON), if the lamp filament opens, or if the thermostat opens.

Self Diagnostic Code 21:
Scanner Home Position Check
Code 21 is displayed if the scanner home position sensor stays deactivated for more than 2 seconds. This code is effective only when the scanner home position is initialized.

Self Diagnostic Code 23:
No Registration Start Signal
Code 23 is displayed if the optics board does not send the registration start signal to the main board. The main board waits 4 seconds for this signal.

Self Diagnostic Code 24:
No Scanner Home Position Signal
Code 24 is displayed if the optics board does not send the scanner home position signal to the main board. The main board waits 20 seconds for this signal.

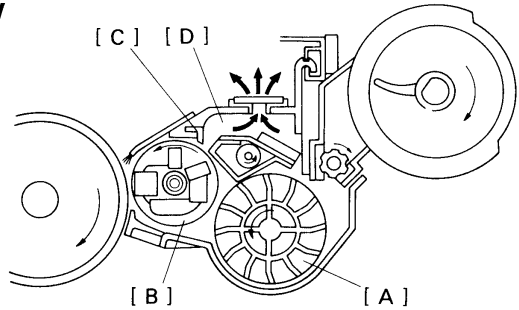
Self Diagnostic Codes 28 and 29:
Lens Home Position Check
Code 28 is displayed if the lens home position sensor stays deactivated more than 3 seconds. Code 29 is displayed if the scanner home position sensor stays activated more than 3 seconds.

Self Diagnostic Codes 2A and 2B:
Second Scanner Home Position
At certain times (power ON, clear, timer) the second scanner either moves to its home position or moves out and back. Code 2A is displayed if the second scanner home position sensor stays deactivated longer than 2.5 seconds. Code 26 is displayed if the second scanner home position sensor stays activated longer than 2.5 seconds.

Self Diagnostic Codes 2C and 2D:
Scanner Motor Encoder Frequency
Code 2C is displayed if the frequency of the signal from the scanner motor encoder is too high. Code 2D is displayed if the frequency of the scanner motor's signal is too low.

DEVELOPMENT

OVERVIEW



When the main motor turns on, the paddle roller [A] and development roller [B] start turning. The paddle roller picks up developer in its paddles and transports it to the development roller. Internal permanent magnets in the development roller attract the developer to the development roller sleeve.

The turning sleeve of the development roller then carries the developer past the doctor blade [C]. The doctor blade trims the developer to the desired thickness and creates backspin to the cross-mixing mechanism.

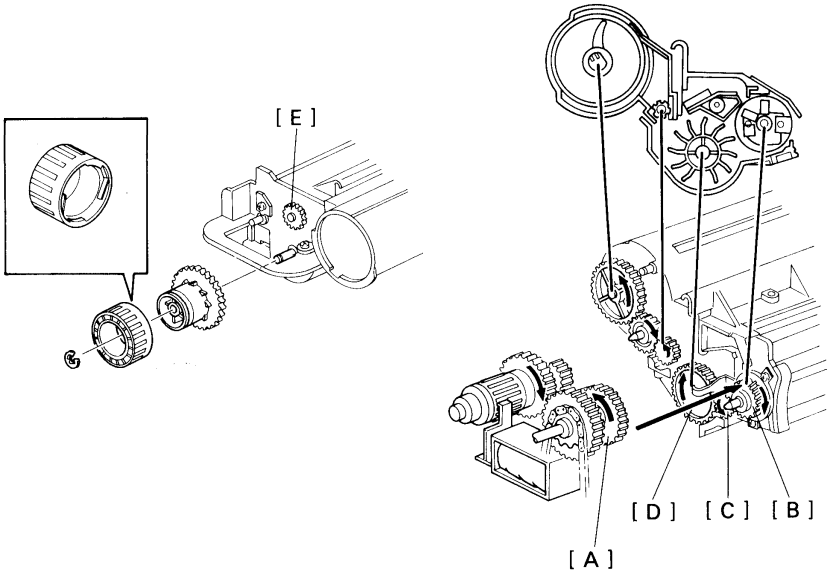
The development roller continues to turn, carrying the developer to the selenium drum. When the developer brush contacts the drum surface, the positively charged areas of the drum surface attract and hold the negatively charged toner. In this way, the latent image is developed.

Positive bias is applied to the development roller to prevent toner from being attracted to non-image areas on the drum that may have residual positive charge. The bias also controls image density.

After turning another 100 degrees, the development roller releases the developer to the developer tank. The developer is agitated by the paddle roller and the cross-mixing mechanism.

Also, in this machine, rotation of the paddle roller [A] and development roller [B] tend to cause air pressure inside the unit at point [D] to become higher than the air pressure around the development unit. Therefore, a hole, fitted with a filter, has been added to the top of the unit to relieve air pressure and to minimize toner scattering.]-This air flows across the face of the ID sensor and helps to dislodge any toner or paper dust that may have fallen there. Also, the bottom plate of the unit is made of aluminum to improve heat transmission.

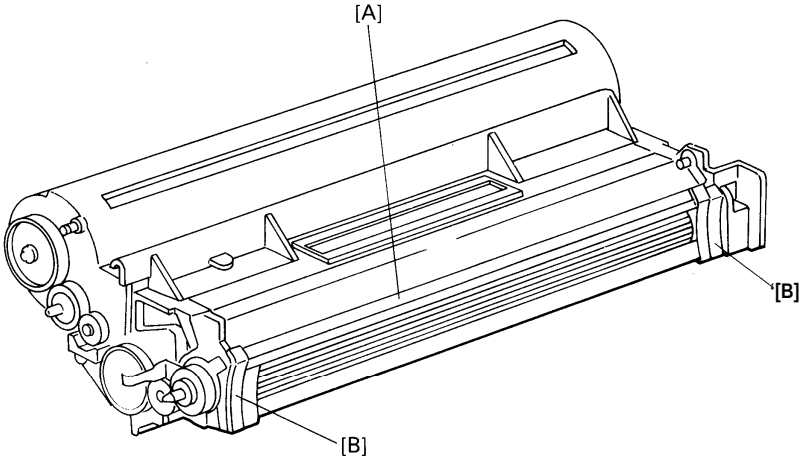
DRIVE MECHANISM



The development drive gear [A] drives the gears of the development unit when the main motor is turning. The rotation is transmitted from the development drive gear to the development roller gear [B] and then through an idle gear [C] to the paddle roller gear [D]. A gear on the front end of the paddle roller shaft drives the auger gear [E].

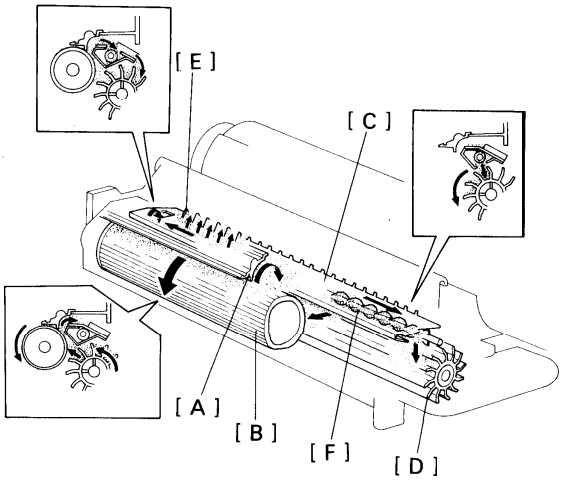
The paddle roller shaft has a knob on its front end to facilitate gear engagement and to turn the rollers for developer exchange. The paddle roller knob has a one-way clutch inside. The one way clutch prevents the development roller from turning in the opposite direction, which would cause the developer brush to damage the upper brush seal.

SEALS



Several seals prevent toner from spilling out into the copier. The upper brush seal [A] prevents particles from scattering upward. The side seals [B] at the ends of the development unit contact the drum-ends (out of the image area); they prevent toner from scattering out of the sides.

CROSS-MIXING



This copier uses a standard cross-mixing mechanism to keep the toner and developer evenly mixed. It also helps agitate the developer to prevent developer clumps from forming and helps create the triboelectric charge.

The developer on the turning development roller is split into two parts by the doctor blade [A]. The part that stays on the development roller [B] forms the magnetic brush and develops the latent image on the drum. The part that is trimmed off by the doctor blade goes to the backspin plate [C].

As the developer slides down the backspin plate to the paddle roller [D], the mixing vanes [E] move it slightly toward the rear of the unit. Part of the developer falls into the auger inlet and is transported to the front of the unit by the mixing auger [F].

IMAGE DENSITY CONTROL

Image density is controlled by changing two items: (1) the strength of the bias voltage applied to the development roller sleeve, and (2) the strength of the voltage applied to the exposure lamp.

Applying a bias voltage to the development sleeve reduces the potential between the development roller and the drum, thereby reducing the amount of toner transferred. As the bias voltage becomes greater, the copy image becomes lighter. Similarly, increasing the voltage to the exposure lamp causes an increase in light intensity which also results in lighter copies.

The method of control is different depending on whether the image density is manually selected or the automatic ID system is used.

1. Manual Image Density Control

Manual Image Density Control

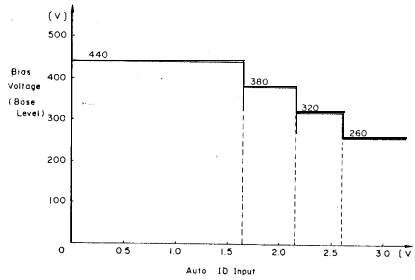
		Image Density Level (Auto Image Density Base Level)							Lamp Voltage(V)
		1	2	3	4	5	6	7	
Manually Selected ID Level	1	230	260	290	320	380	440	500	Vo-2.5
	2	200	230	260	290	350	410	470	Vo
	3	200	200	230	260	320	380	440	Vo+2.5
	4	200	200	230	260	320	380	440	Vo+5
	5	200	200	230	260	320	380	440	Vo+7.5
	6	200	200	230	260	320	380	440	Vo+10
	7	230	260	290	320	380	440	500	Vo+10
		Development Bias Voltage (V)							

When the image density is set manually, the bias depends on two factors: the auto image density base level, and the manually selected ID level. (See the above table.) The exposure lamp voltage also varies as shown in the table.

NOTE: To set the auto image density base level, simultaneously press and hold the Clear/Stop key and press the Auto ID key. Then, select the base level using the manual ID keys.

2. Automatic Image Density Control

Bias Data				Bias
SEL4	SEL3	SEL2	SEL1	Output(V)
0	0	0	1	200
0	0	1	0	230
0	0	1	1	260
0	1	0	0	290
0	1	0	1	320
0	1	1	0	350
0	1	1	1	380
1	0	0	0	410
1	0	0	1	440
1	0	1	0	470
1	0	1	1	500
1	1	0	0	530
1	1	0	1	560
1	1	1	0	590
1	1	1	1	620
0	0	0	0	MAX50



Auto Image Density Control

		Image Density Level (Auto Image Density Adjustment)							Lamp
		1	2	3	4	5	6	7	Voltage[V]
Auto Image Density Sensor Output Voltage	5V-2.6V	200	200	230	260	320	380	440	\
	2.6V-2.16V	230	260	290	320	380	440	500	Vo+5
	2.16V-1.65V	290	320	350	380	440	500	560	
	1.65V-0V	350	380	410	440	500	560	620	

Development Bias Voltage (V)

When automatic image density control is on, the exposure lamp voltage is set to Vo + 5 volts. A change in the bias voltage only controls the image density. The normal factory setting is the fourth column; however, this setting can be changed for troubleshooting or to satisfy customer requirements by selecting the Auto ID mode, holding down the Clear/Stop key, and pressing the image density keys.

At the start of the copy cycle, the original sensing mechanism measures the background density of the original image. It does this by measuring the strength of the light reflected from a 30 mm strip near the leading edge of the original. A fiber optic cable pipes the reflected light to a photodiode on the lamp regulator board. The photodiode is the input element of the auto ID circuit.

The CPU checks the voltage output by the auto ID circuit. This circuit has a peak hold function. The peak hold voltage corresponds to the maximum reflectivity of the original. The CPU then determines the proper bias base level, with reference to the peak hold voltage, and sends a 4-bit control signal to the power pack. The power pack then applies the proper bias to the development roller.

3. **Bias Compensation Factors**

As discussed previously, either the automatic image density system or the operator, through the image density keys, sets the bias base level (VI). The CPU increases the bias base level as necessary to compensate for the rest time between copy runs and the drum temperature, both of which affect drum sensitivity.

TD: 10° C-20 'C

Copy# / Rest Time	1	2	3	4-5	6-10
0-10sec	One step down from previous states				
10sec-3min					
3min-50min	30	30	0	0	0
50min-2hr	30	30	30	0	0
2hr-	60	30	30	30	0

TD: 20 °C-45 °C

Copy # / Rest Time	1	2	3	4-5	6-10
0-10sec	One step down from previous states				
10sec-3min	30	30	30	0	0
3mln-50min	60	60	30	30	0
50min-2hr	90	60	60	30	30
2hr-	120	90	90	60	30

TD: Drum Temperature

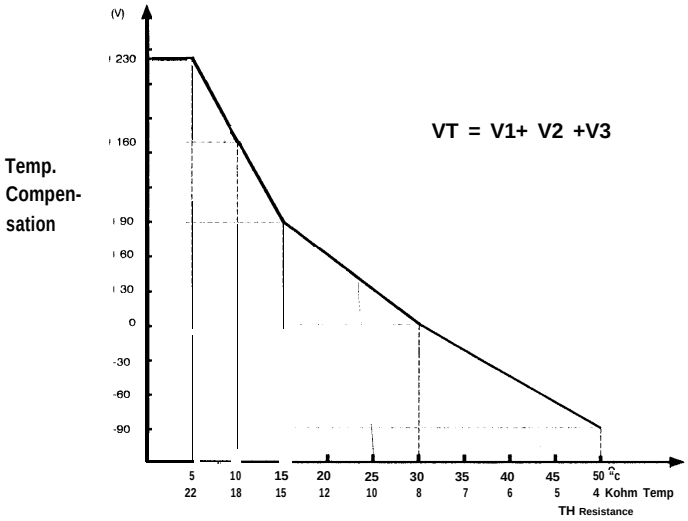
4. **Rest Time Compensation (V2)**

The drum sensitivity often drops slightly over the first few cycles of a copy run. This is because the light from the exposure lamp fatigues the drum slightly, and it takes a few copies for the selenium to restabilize. The amount that the sensitivity drops depends on the drum's temperature and the rest time between copy runs (the longer the rest time, the greater the change).

The copier increases the bias at the beginning of each copy run to prevent variations in the image density of the first few copies produced. The above two tables show the amount of bias increase. If the drum temperature is less than 10 degrees Celsius, no rest time compensation is applied.

When the main switch is turned on, the CPU automatically selects the "greater than two hours" rest time compensation level.

5. Drum Temperature Compensation (V3)



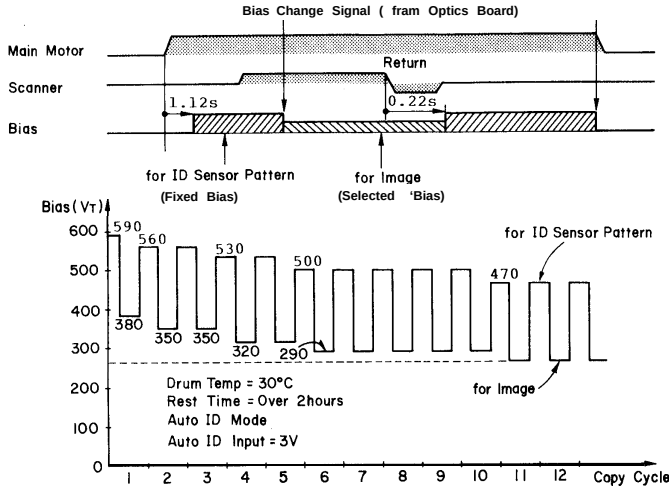
The CPU monitors drum temperature through a thermistor (TH-2), and it increases or decreases the bias voltage to compensate for variations in drum sensitivity that are induced by temperature changes in the drum cavity. The temperature compensation is effective from 5 degrees to 50 degrees (Celsius).

As shown by the "knee" in the above chart, the temperature compensation factor depends on the temperature range. Between 5*C and 15*C, the change in V3 is -14 V/°C; between 15°C and 50°C, the change in V3 is -5 to -6V/°C.

6. **Total Bias (VT)**

The total bias applied to the development roller sleeve is the sum of the base bias and the two compensating factors.

BIAS FOR ID SENSING



To develop the ID sensor pattern consistently, the CPU applies a fixed base bias level to the development roller at the beginning of each copy cycle. The fixed base bias is 470 volts (SP Mode data selectable) after ten copies; prior to which, it is affected by drum cavity temperature and drum rest time.

The CPU applies the ID sensor bias to the development roller about 1.12 seconds after the Start key is pressed. Just after the sensor pattern is developed, the CPU changes the bias output to the level selected by the auto ID sensor or the operator for image development. The bias output remains at this level until 0.22 seconds after the scanner starts returning.

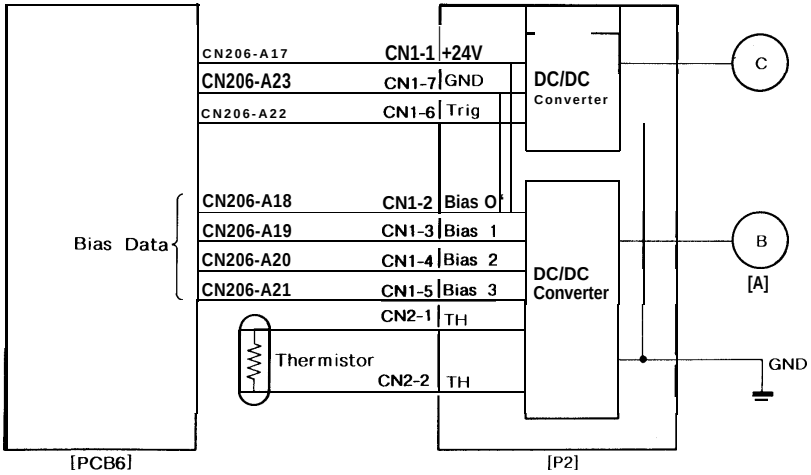
The ID sensor bias can be changed by SP Mode #33 to adjust the overall image density as follows:

ID Sensor Bias (SP Mode # 33)

Data	Base Bias
0:	470V
1:	440V
2:	500V
3:	530V

Normally the data of SP Mode # 33 is “O” (factory preset).

BIAS CONTROL CIRCUIT



The CPU sends a bias trigger signal and a 4-bit control signal to turn on the development bias of the power pack. These signals depend on the Image Density level position and the copier's rest time.

After receiving these signals, the power pack outputs the proper bias voltage, which is further compensated for temperature (by the resistance of the bias thermistor located on the erase lamp unit).

The bias voltage can be displayed on the operation panel by using SP Mode # 59. The displayed value does not include the temperature compensation factor.

Also, when thin paper is used, the bias timing can be changed by SP Mode #72 to prevent toner re-attraction to the drum. No voltage is applied to the bias roller while the lead edge is being erased according to SP Mode #41.

COLOR DEVELOPMENT

1. Overview

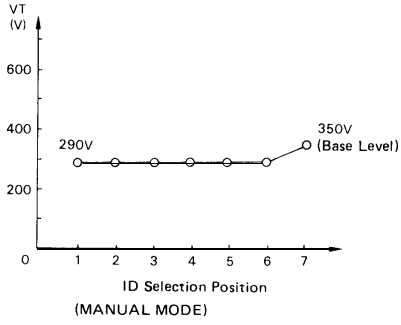
This copier has mono-color copying capability in red, green, and blue as well as standard black. To change colors, the development unit must be replaced.

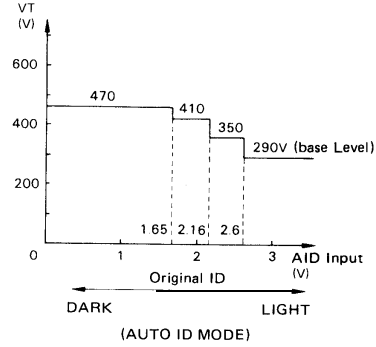
To detect which color is used, an actuator is mounted on the development unit. Since the reflectivity varies with the color of the toner, the toner end detection system uses a mechanical detection system instead of an ID sensor detection system.

2. Bias Control

Due to the differences in the characteristics of black and color toner, the CPU changes the bias control when it detects a color development unit.

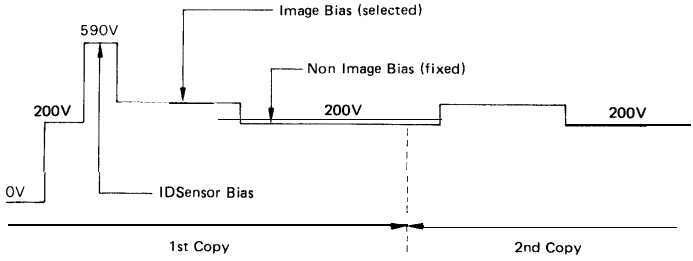
3. Base Bias for Color





4. Bias for ID Sensing

Since the reflectivity of color toner varies with the color type, the ID sensor is used only to detect overtoning. Just as for black copies, the image density is sensed once in 10 copy cycles.

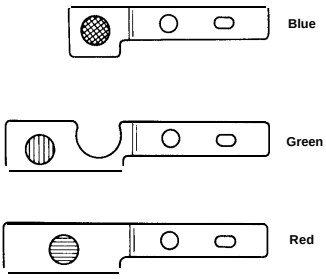


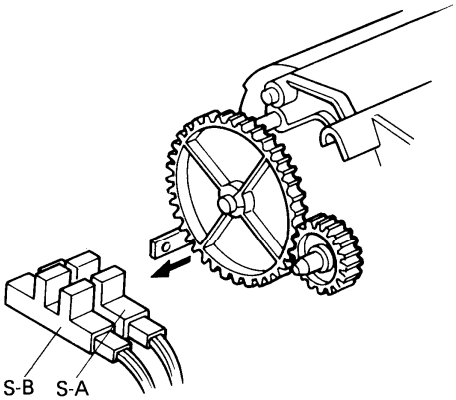
The ID sensor bias can be changed to adjust the color image density by using SP Mode # 75 as follows:

Data	ID Sensor Bias
0:	590 volts
1:	620 volts

Normally, the data of SP Mode # 75 is "O". When the data is changed to "1", the threshold level for toner supply inhibition is increased. This causes the toner density to become higher. (See the section on color toner density control.)

5. **Color Detection**





Color Toner Sensors*

S-A	S-B	Toner
OFF	OFF	Black
ON	OFF	Blue
OFF	ON	Green
ON	ON	Red

Three actuators, each having a different shape, are used to distinguish between the different toner colors. When a color development unit is installed in the copier, the actuator activates the color toner sensors. The CPU determines which color unit is installed based on the input from these two sensors. (See the preceding table.)

* ON = actuator blocking the gap of the photo-interrupter.

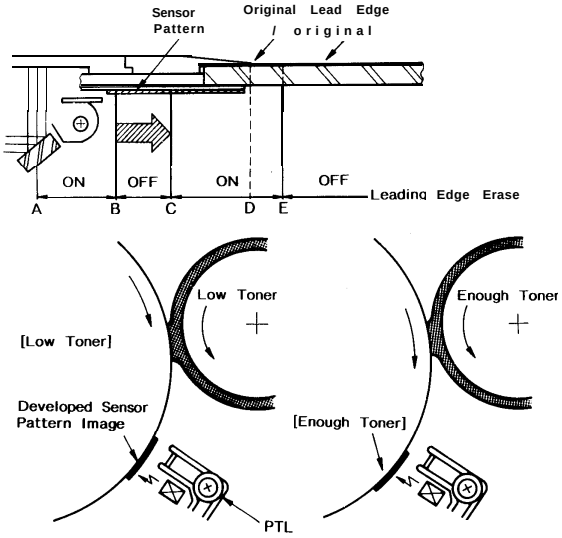
SERVICE CALL CONDITIONS

Self Diagnostic Code 31:
Drum Thermistor Open
Code 31 is displayed if the drum thermistor circuit becomes open.

Self Diagnostic Code 32:
PTL / ID Sensor Board Open
Code 32 is displayed if the PTL/ID sensor board circuit opens or is not set properly.

TONER DENSITY DETECTION AND TONER SUPPLY

TONER DENSITY DETECTION

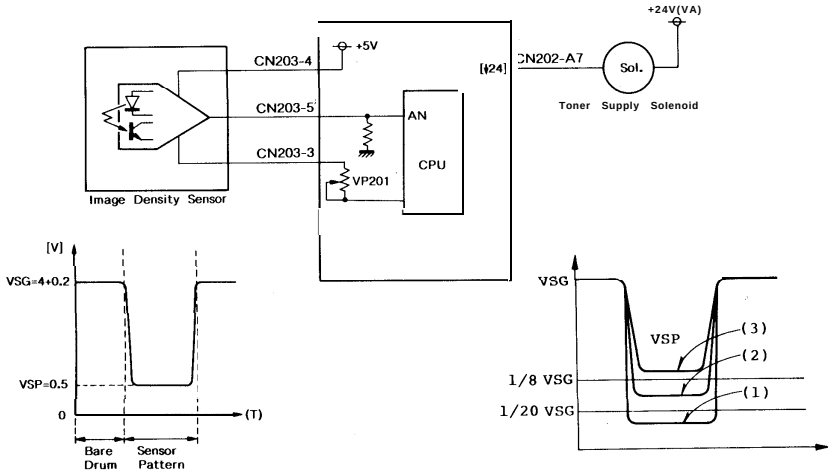


The main CPU checks toner density by directly sensing the image density at the beginning of the first copy cycle after the main switch is turned on, and at every 10th copy after that.

During the check cycles, the sensor pattern is exposed prior to exposure of the original. After the sensor pattern is developed, its reflectivity is checked by the image density sensor (which is a photosensor). The CPU notes the reflectivity. **If the reflected light is too strong, indicating** a too low toner density condition, it adds toner to the development unit.

The toner is not added all at once. The CPU energizes the toner supply solenoid for the proper amount of time to add a selected amount of toner over the next 10 cycles.

TONER DENSITY CONTROL



The Image density sensor checks the density of the sensor pattern image once every 10 copy cycles. The CPU receives two voltage values directly from the sensor: the value for the bare drum (Vsg) and the value for the sensor pattern (Vsp). These two values are then compared to determine whether more toner should be added.

- Detect Mode B -

1. Vsp ≦ 1/20 Vsg (No toner is added)

2. 1/20 Vsg < Vsp ≦ 1/8 Vsg (The amount of toner selected by SP Mode # 34 is added.)

3. Vsp > 1/8 Vsg (The amount of toner selected by SP Mode # 31 is added.)

When the image density is too low, the CPU activates the toner supply solenoid to add a selected amount of toner over the next 10 copy cycles.
To maintain the image density precisely and prevent toner re-attraction to the drum, the toner supply amount is changed automatically according to the Vsp value.
if Vsp is in condition (2), the amount of toner selected by SP Mode # 34 is added. If Vsp is in condition (3), the amount of toner selected by SP Mode # 31 is added.
When Vsp is less than 1/20 Vsg, toner is not added.

Detect mode A controls toner density as follows:

1. Vsp ≦ 1/8 Vsg.. . . . ..High image density (no toner is added)

2. V_{SP} > l/8 Vsg . . . . . Low image density (toner is added)

SP Mode # 35 changes the toner end detection level and the timing cycle. The toner end detection level drops to 0.65 and the monitoring cycle is every 5 copy cycles.

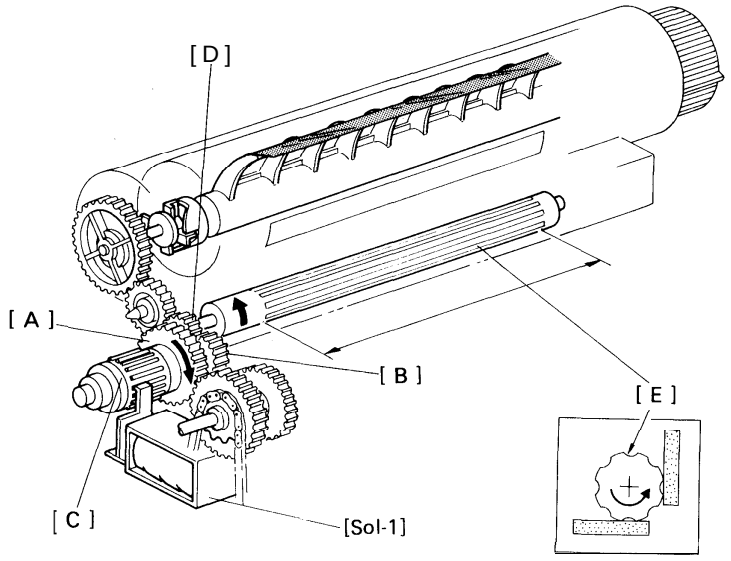
To calibrate the photosensor Vsg, turn on the sensor LED with SP Mode # 54 and adjust its light intensity with VR201.

Toner density control can be selected with SP Mode # 30.

If Vsg becomes less than 2.5 volts, the CPU determines that the sensed data is abnormal. It then changes from detect mode to fixed supply mode. The amount supplied is determined by the data of SP Mode # 32 (fixed mode). At the same time the Service Call indicator starts blinking. However, copies can still be made.

TONER SUPPLY

1. Roller Drive Mechanism

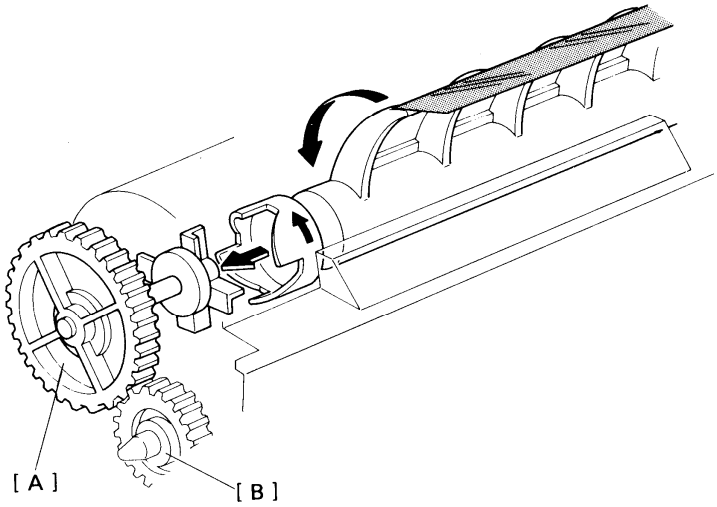


The toner supply clutch gear [A] turns when the main motor is on. The transmission of this rotation to the toner supply drive gear [B] is controlled by the toner supply clutch [C].

When the toner supply solenoid [SOLI] energizes, the toner supply clutch engages and starts turning the toner supply drive gear. The toner supply drive gear turns the toner supply roller gear [D]. Toner catches in the grooves on the toner supply roller [E]. Then, as the grooves turn past the opening, the toner drops into the development unit.

The toner supply opening is the same width as A4 lengthwise **(8 1/2" x 11")** and is located at the center of the developer tank. This is to reduce toner scattering from both the ends of the development roller even if small size paper is used continuously.

2. Toner Agitator Drive Mechanism



The toner agitator mechanism, contained in the toner cartridge, prevents toner from blocking.

The toner supply roller gear engages the toner agitator gear [A] through an idle gear [B]. Therefore, the toner agitator gear turns whenever the toner supply clutch is engaged.

Rotation passes through the toner cartridge casing to the agitator junction.

TONER SUPPLY AMOUNT

Detect Supply Mode				Fixed Supply Mode			
Mode B (SP # 34)		Mode A (SP # 31)		Black (SP # 32)		Color (SP # 70)	
Data	Supply Amount	Data	Supply Amount	Data	Supply Amount	Data	Supply Amount
0	2 %	0	30 %	0	7 %	0	14%
1	4%	1	15%	1	3.5%	1	7 %
		2	45%	2	10.5%	2	21%
		3	60%	3	14%	3	28%
						4	35%
						5	42%
						6	49%
						7	56%

This copier has two different ways of controlling the amount of toner supplied. Normally, the detect supply system controls toner supply; however, a fixed supply system can also be selected. When a color toner development unit is installed, the CPU automatically selects fixed supply mode.

1. Detect Supply Mode

When SP Mode # 30 is "O", the standard detect supply mode B is selected. If a low image density condition is detected, a small amount of toner is supplied during each of the next 10 copy cycles as determined the settings in SP Modes # 34 and # 31.

Toner supply starts 0.52 second after the scanner motor reverses. (Toner is supplied at this time to prevent toner scattering on the copies.) The actual amount of toner added is determined by controlling the ON time of the toner supply solenoid, which activates a spring clutch.

2. **Fixed Supply Mode**

When SP Mode # 30 is "1", or a color development unit is installed, the fixed supply mode is selected. In this case, a fixed amount of toner is added every copy cycle as determined by the setting of the SP Mode # 32. When a color development unit is installed, a fixed amount of toner is determined by the setting of SP Mode # 70. The length of time that the toner supply solenoid is energized depends on the setting for SP Mode # 32 (Black) or # 70 (color) and the paper size.

TONER END DETECTION

The CPU uses the image density sensor to detect a toner end condition. This method is effective in both detect and fixed supply modes.
If Vsp becomes greater than 0.75 volt, the CPU determines that it is time to add toner and starts blinking the Add Toner indicator.
After the indicator starts blinking, the operator can make up to 50 copies. If a new toner cartridge is not added within that 50 copy interval, the Add Toner indicator stops blinking (stays on) and copying is inhibited. The toner end condition is reset by opening and closing the front cover.

COLOR TONER DENSITY DETECTION AND COLOR TONER SUPPLY

1. **Color Toner Density Control**

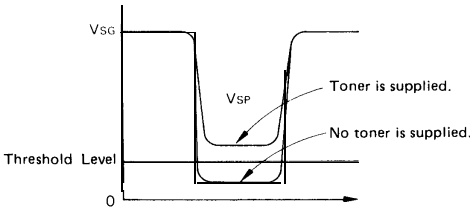
When a color development unit is used, the CPU automatically selects the fixed toner supply mode. SP Mode # 70 determines the supply amount.

The CPU calculates the threshold level for toner supply inhibition when the color development installation procedure is completed. This level is determined by calculating the average of Vsp and Vsg while using new developer.

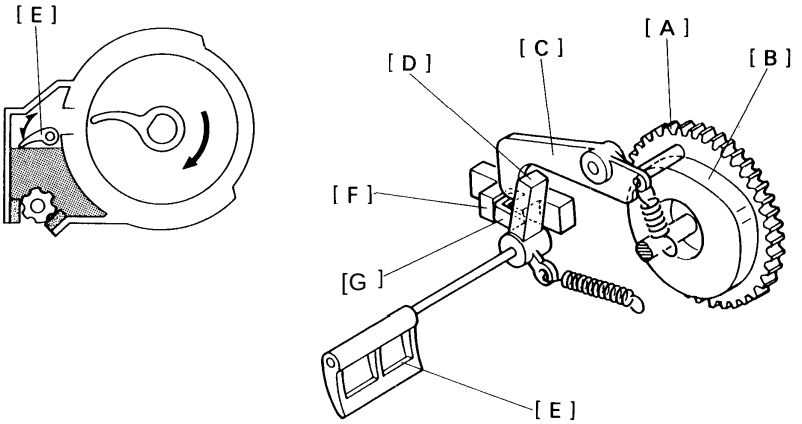
Since the fixed supply system is selected when in color toner mode, it is necessary to inhibit toner supply if the toner density becomes high to prevent over-toning. The CPU checks Vsp once in 10 copy cycles. If Vsp becomes lower than the threshold level, the CPU stops supplying toner. Toner supply resumes when Vsp rises above the threshold level again.

A RAM stores the threshold level data for the three colors. The CPU selects the correct threshold level from this RAM after checking the color signal from the color toner sensors. The power supply for the RAM has battery backup so the data will not be lost if the power supply is disconnected.

The RAM stores not only the threshold level data but also the number of copies made with each color. This data can be displayed on the operation panel by using SP Mode # 73.



2. **Color Toner End Detection**



The toner agitator gear [A] has a cam [B] (the toner end cam) on its inner surface, and it rotates only when toner is supplied. The cam follower on the end of the toner end lever [C] rides on the surface of the toner end cam (spring pressure). The opposite end of the toner end lever alternately presses and releases the toner end arm [D] as the cam turns. The toner end plate [E], which is in the toner hopper, is mounted on the same shaft as the toner end arm.

When there is sufficient toner in the hopper, the toner end plate is prevented from moving by the toner. Therefore, even when the toner end lever drops to the lowest position on the cam (releasing the toner end arm), the toner end arm does not move and the toner end sensor [F] is not activated.

When there is insufficient toner in the hopper, the toner end plate can move. When the toner end lever releases the toner end arm, the toner end plate lowers and the actuator [G] on the toner end arm moves into the toner end sensor. The CPU receives a single pulse from the toner end sensor.

If this condition is detected by the CPU more than seven times consecutively, the Add Toner indicator starts blinking.

After the indicator starts blinking, 50 copies can be made. If a new toner cartridge is not added within that 50 copy interval, the Add Toner indicator stops blinking (stays on) and copying is inhibited.

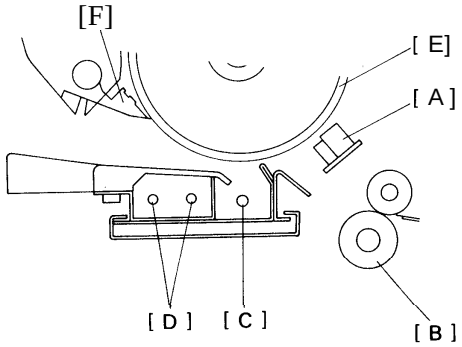
3. **Abnormal Condition**

If Vsg becomes lower than 3.2 volts, the machine will reduce toner supply to half of the normal supply amount. (For example, the amount of toner supply will change from 14% to 7% when "O" is stored in SP Mode No. 70.) In this condition, the Service Call indicator is not displayed and the machine can be operated.

SERVICE CALL CONDITION

Service Call Indicator Blinks (no code):
ID Sensor Abnormal
The Service Call indicator starts blinking if Vsg becomes less than 2.5 volts. When this happens, the machine automatically shifts to the fixed supply mode. Operation is possible.

IMAGE TRANSFER AND PAPER SEPARATION



PRE-TRANSFER LAMP (PTL)

After the latent image is developed but before the image is transferred to the copy paper, the drum surface is illuminated by the pre-transfer lamp [A]. This illumination reduces the positive potential on the drum surface. This prevents the toner particles from being re-attracted to the positively charged drum during the paper separation process. It also makes image transfer and paper separation easier.

IMAGE TRANSFER

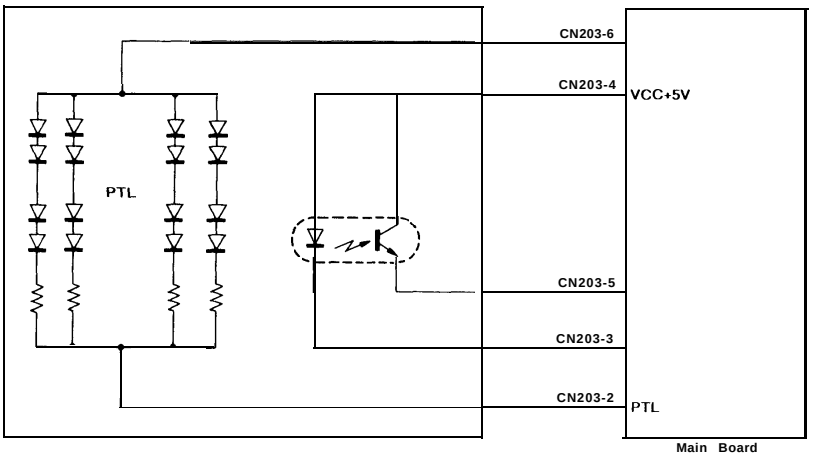
The registration rollers [B] feed the copy paper through the transfer entrance guides to the transfer section. A high positive voltage (+ 5.6 kilovolts) is applied to the transfer corona wire [C], and the corona wire generates positive ions. These positive ions are applied to the copy paper, and the positive charge attracts the negatively charged toner away from the drum and onto the paper. In addition, the paper is held against the drum by the negative counter charge on the drum.

PAPER SEPARATION

After image transfer the copy must be separated from the drum. To break the attraction between the paper and the drum, the separation corona wire [D] applies an ac corona (500 Hz) to the reverse side of the paper. The stiffness and weight of the paper causes it to separate from the drum [E].

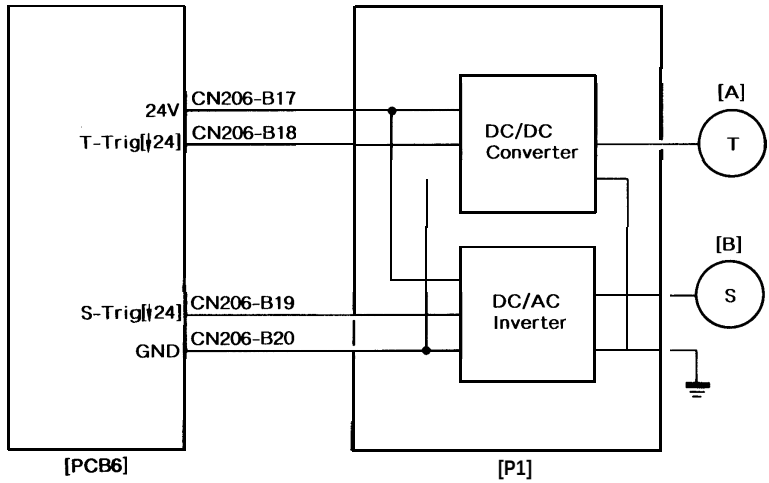
The separation corona has a small de bias but its effect is negligible. A de bias is unnecessary because the separation corona is wide and diffuse. The positive charge on the paper (from the transfer corona) is not completely discharged until the paper is far enough from the drum that the toner will not be reattracted to the drum. The two pick-off pawls [F] ensure that thin, low-stiffness paper or upward curled paper separates completely.

PRE-TRANSFER LAMP CIRCUIT



When the Start key is pressed, the main board outputs a LOW signal to activate the pre-transfer lamp. The pre-transfer lamp, like the erase lamp, is an array of LEDs. However, the CPU does not control the individual elements of the pre-transfer lamp as it does the erase lamp. Instead, all of the LEDs turn on and off simultaneously.

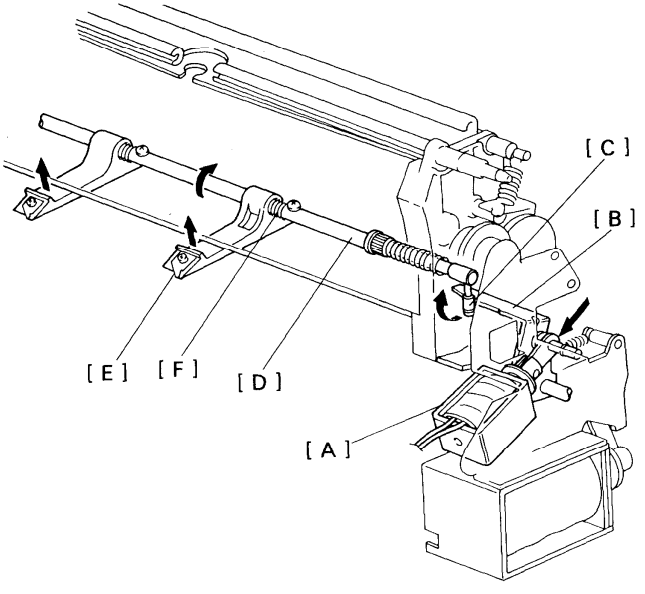
TRANSFER/SEPARATION CORONA CIRCUIT



When the Start key is pressed, the main board sends LOW signals to energize the power pack for the transfer and separation coronas. The power pack has a dc to dc converter and a dc to ac inverter. The dc to dc converter changes +24 volts to +5.6 kilovolts for the transfer corona [A]. The inverter changes +24 volts to 5.0 kilovolts ac (500 Hz) with a negative dc bias (about -90 V) for the separation corona [B].

PICK-OFF MECHANISM

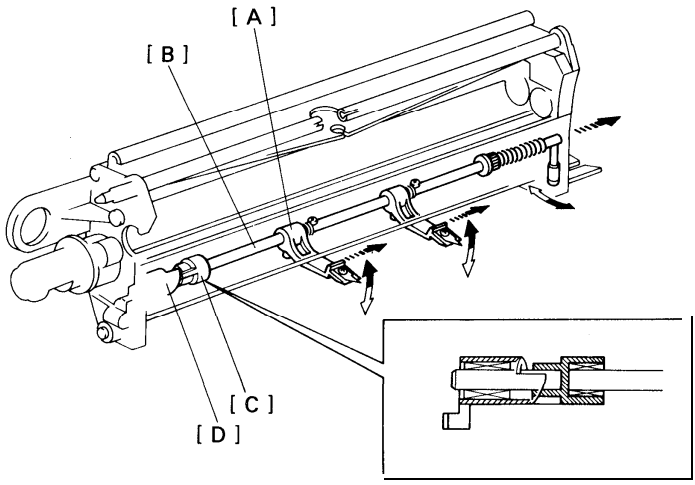
1. Touch and Release Mechanism



The pick-off solenoid [A] energizes 1.69 seconds after the Start key is pressed. The pick-off lever [B] rotates counterclockwise (rear view) and pushes the pawl shaft pin [C]. Then the pawl shaft [D] rotates clockwise and the pick-off pawls [E] touch the drum. The pawl springs [F] hold the pick-off pawls on the shaft and prevent them from touching the drum too strongly.

When the leading edge of the paper passes the pick-off area and just before it reaches the fusing unit, the pick-off solenoid turns off. The pick-off lever spring then rotates the pick-off lever and moves the pick-off pawls away from the drum.

2. **Side to Side Movement**

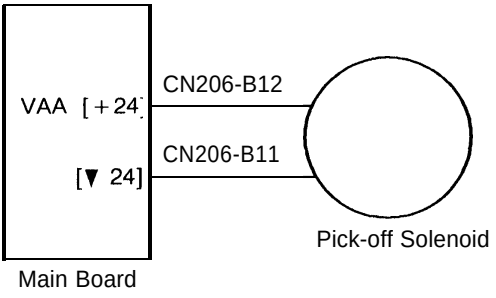


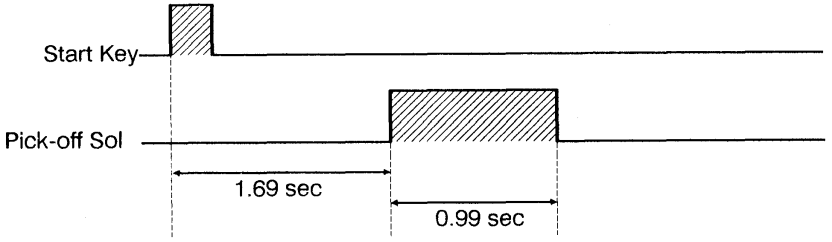
The pick-off pawls [A] do not always contact the drum in the same place but instead move slightly to the side on each copy cycle.

The pick-off pawl shaft [B] and the cam rider [C] are joined by a one-way bearing [D]. Each time the pick-off pawl solenoid turns on, the one-way bearing causes the cam rider to turn together with the pick-off pawl shaft. As the cam rider turns, it and the pawl shaft are forced to move laterally by a cam. However, when the pawl shaft rotates the pawls away from the drum the cam rider does not turn.

Pawl lateral movement is 0.1 to 0.2 millimeter per copy cycle. After the pick-off pawls move about 8 millimeters, the cam rider passes the “step” of the cam and the pawl shaft is returned to its start position by the pawl shaft spring.

PICK-OFF CIRCUIT



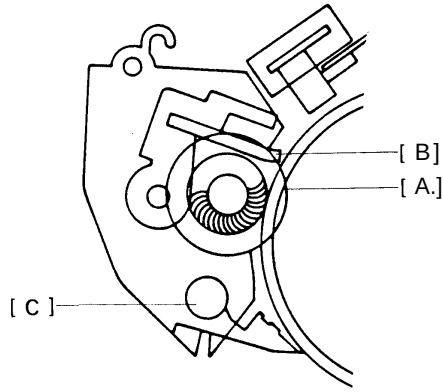


The main PCB supplies +24 volts to the pick-off solenoid at CN206-B12. The CPU supplies a LOW signal at CN206-B11 1.69 seconds after the Start key is pressed. This LOW signal energizes the pick-off solenoid.

The CPU waits 0.99 second before turning off the pick-off solenoid. The leading edge of the paper has just passed the pick-off area at this time.

DRUM CLEANING

OVERVIEW



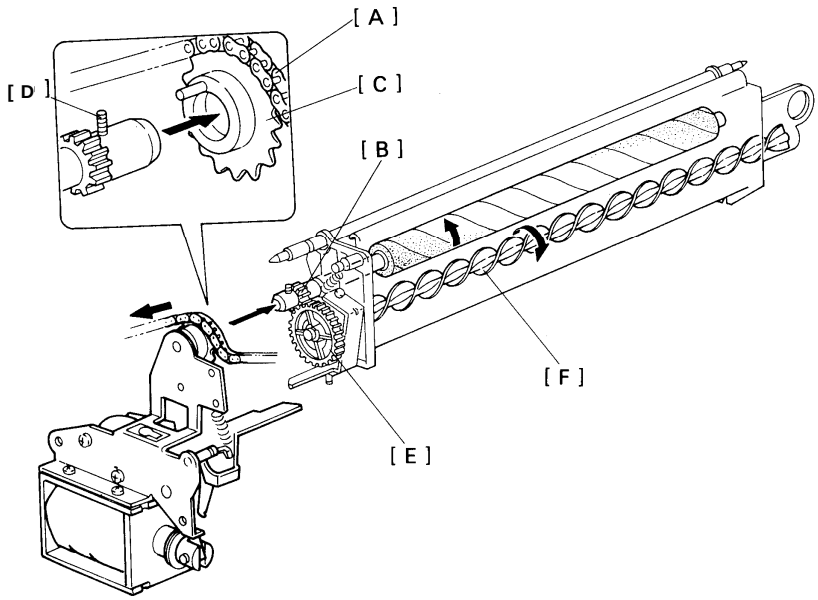
The cleaning brush [A] and cleaning blade [B] remove any toner remaining on the drum after the image is transferred to the paper.

The cleaning brush and drum move in opposite directions at their point of contact. The cleaning brush removes paper dust and nearly half of the toner from the drum surface to reduce the cleaning load placed on the blade.

Next, the cleaning blade removes the remaining toner. The falling toner catches in the fibers of the cleaning brush and is carried inside the cleaning unit. As the brush turns inside the cleaning unit, it rubs against a beater ridge, which dislodges the toner particles. The toner particles fall onto the toner collection coil [C].

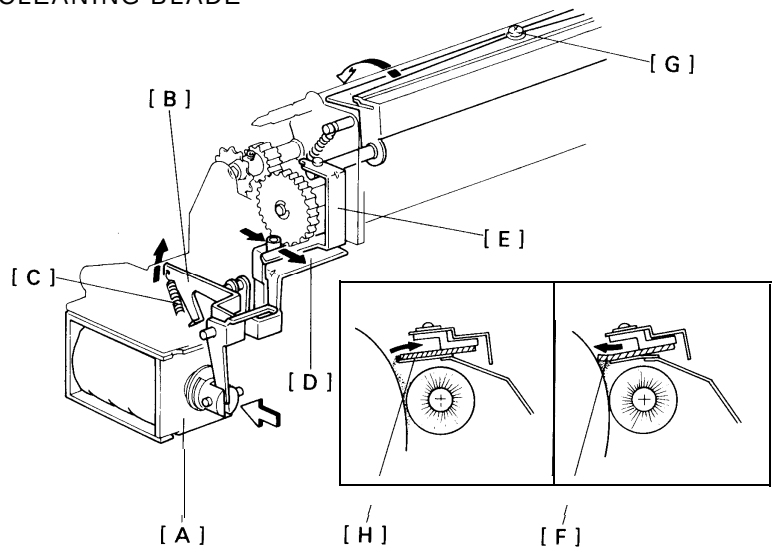
The toner collection coil transports the used toner to the front of the machine where it falls into the used toner bottle.

DRIVE MECHANISM



The main chain [A] drives the cleaning unit when the main motor is on, The brush gear [B] is fitted into the cleaning drive sprocket [C]. A pin on the inside of the sprocket drives an allen screw [D] on the shaft of the gear, turning the gear. The brush gear drives the coil gear [E] directly, and the toner in the unit is transported to the used toner bottle by the toner collection coil [F].

CLEANING BLADE

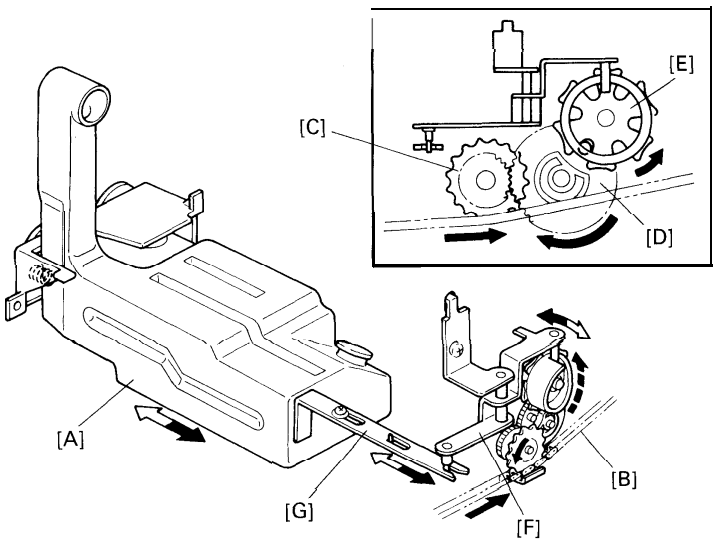


The cleaning pressure mechanism is shown above. When the cleaning solenoid [A] is energized, it turns the cleaning solenoid lever [B] clockwise (rear view). Due to the pull of the cleaning blade pressure spring [C], the pressure arm [D] also turns clockwise and pushes the cleaning blade lever [E] up. The cleaning blade holder then rotates and the cleaning blade [F] presses against the drum. The pressure spring limits the blade pressure.

The cleaning blade is mounted by a single swivel screw [G] at its exact center of gravity. With this type of mounting the blade sets parallel and applies even pressure automatically, Also since pressure is transmitted in the center, a single pressure spring is used. Side-to-side movement is applied to the cleaning blade to prevent uneven wear and ensure efficient cleaning.

The blade scraper [H] is mounted in contact with the bottom of the cleaning blade. When pressure is applied to the cleaning blade, it is forced forward and bends at its outer edge. When pressure is released from the blade, it snaps back to its original shape. At this time, the blade scraper [H] scrapes off the excess toner and paper dust from the edge of the blade. This helps to maintain efficient cleaning. The blade pressure is released when there is no key input for 15 minutes, when a paper misfeed occurs, or when the safety switches are open. The blade scraper also prevents toner from scattering inside the copier by keeping toner inside the cleaning unit.

TONER COLLECTION BOTTLE VIBRATION

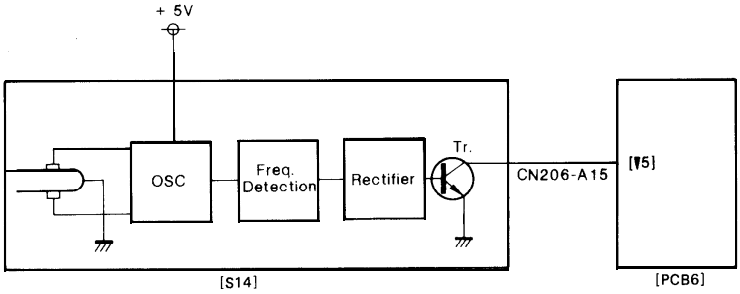


The toner collection bottle [A] is vibrated to prevent toner from building up in one place and activating the toner overflow sensor too early.

The main drive chain [B] turns the drive sprocket [C]. The drive sprocket has a gear on the reverse side which turns the cam drive gear [D]. A pin on the cam drive gear rotates the cam wheel [E]. This wheel has six slots in which the pin catches; so, the cam wheel turns 1/6 of a revolution for each full turn of the cam drive gear.

The cam part of the cam wheel pushes the cam lever [F] out as it turns. The pin on the other end of the cam lever pushes the vibration link [G] toward the front of the copier. This link pushes the toner collection bottle against the spring installed inside the bottle cover. When the cam wheel completes one turn, the cam lever is released and the spring pushes the toner collection bottle quickly toward the rear of the copier. This action keeps the toner level inside the toner collection bottle.

TONER OVERFLOW SENSOR CIRCUIT



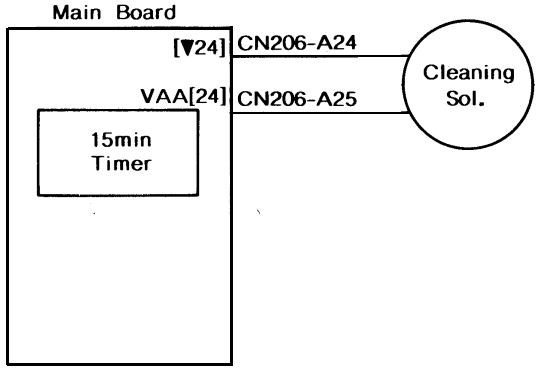
The toner overflow sensor [S14] signals the CPU when the toner collection bottle is full.

A tiny tuning fork is used as the sensing element of the toner overflow sensor. This tuning fork is a damping element in a multivibrator circuit. As long as there is nothing in contact with the tuning fork, the vibrating frequency of the circuit stays low and the transistor stays off.

When toner presses against the tuning fork, the resistance of the piezoelectric , elements that are in contact with the tuning fork changes and the vibrating frequency increases. The frequency detection circuit passes the higher frequency signal to the rectifier which activates the switching transistor. The transistor sends a LOW signal to CN206-A15.

When the CPU detects this LOW signal, it stops the copier, lights the Used Toner Bottle indicator, and blinks the Service Call indicator.

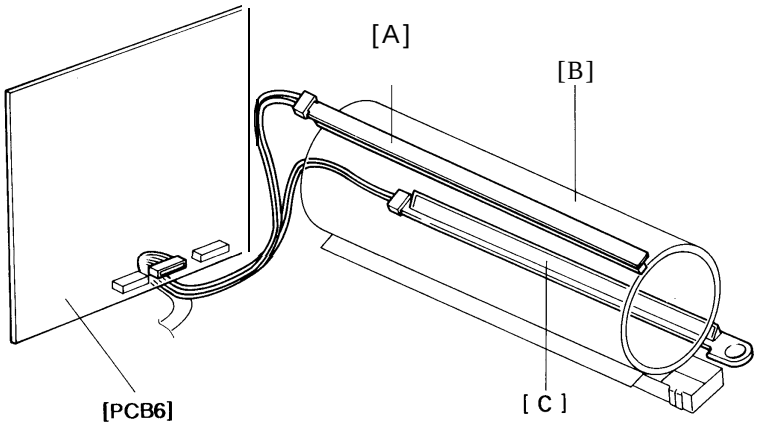
CLEANING SOLENOID CIRCUIT



When the Start key is pressed or the main switch is turned on, the CPU sends a LOW signal to CN206-A24. This signal energizes the cleaning solenoid. Fifteen minutes after the main motor turns off, this signal becomes HIGH again, turning off the solenoid. This releases the cleaning blade from the drum. When the cleaning blade is released, the edge of the blade is cleaned.

The fifteen minute delay for the release of the cleaning blade is to avoid toner scattering. Toner scattering is increased if the cleaning blade is released too frequently.

QUENCHING LAMP

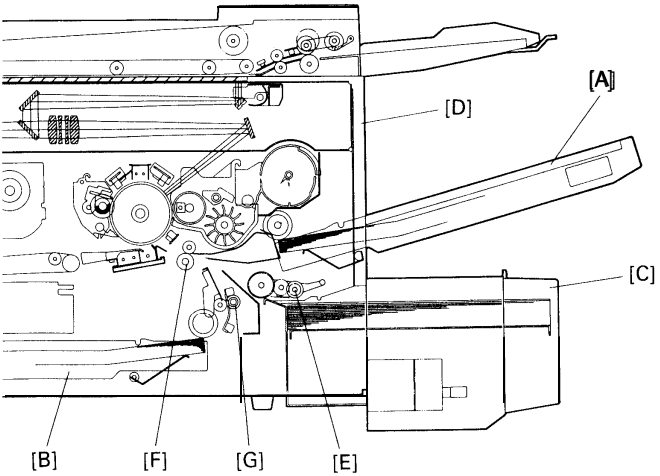


In preparation for the next copy cycle, light from the quenching lamp [A] neutralizes any charge remaining on the drum [B].

The LED array lamp used for quenching is similar to the pre-transfer lamp (PTL) [C]; however, the light intensity of the quenching lamp is less than that of the PTL.

PAPER FEED AND REGISTRATION

OVERVIEW



"This model has three paper feed stations. The first cassette [A] and second cassette are located on the right side of the copier, and the third cassette [B] is located in a tray inside the copier. The capacity of each of the cassettes is 250 sheets.

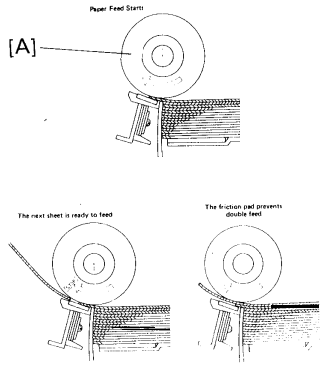
As an option the second cassette can be replaced with a 1,000 sheet large capacity tray [C]. This would increase the maximum paper capacity to 1,500 sheets.

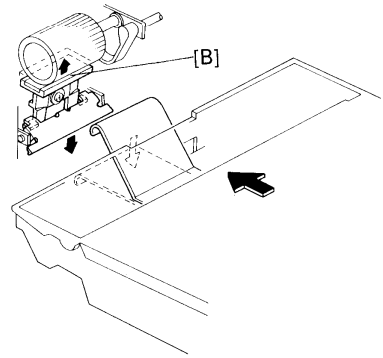
Paper can also be fed using the manual feed table [D], which utilizes the feed mechanism of the first feed station.

All three feed stations use the feed roller and friction pad feed mechanism. The LCT also uses a pick-up roller [E], During paper feed, the top sheet of paper separates from the stack and is fed to the registration rollers. The friction pad prevents all but the top sheet from feeding.

The feed rollers of the first feed station feed the top sheet directly to the registration rollers [F]. The third feed station (cassette tray), however, feeds the top sheet to relay rollers [G], which then feed the sheet to the registration rollers.

FRICTION PAD FEED SYSTEM





This copier uses a feed roller and friction pad paper feed system. The friction pad separates a single sheet from the top of the stack of paper.

When the feed roller [A] starts turning, it forces a single sheet of paper across the friction pad [B]. The roller stops turning when the paper reaches the registration rollers.

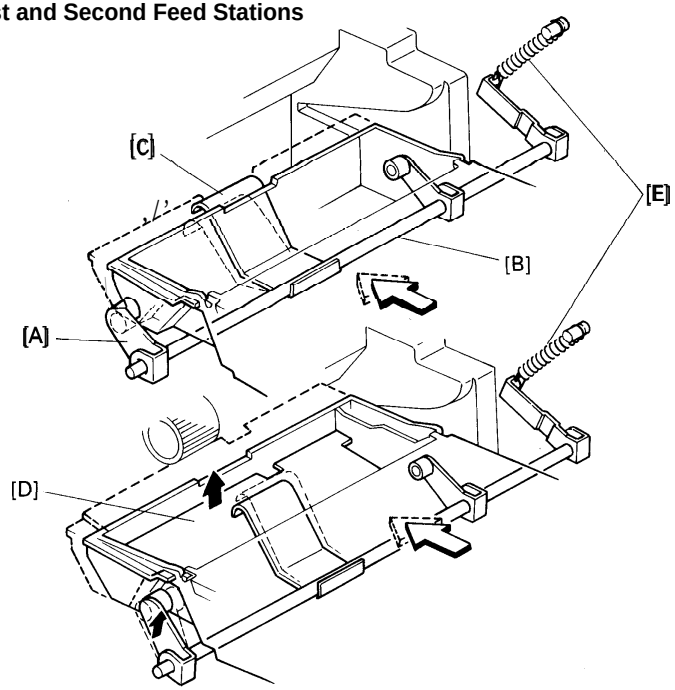
At that time the friction pad is pressing the paper up against the feed roller. So, when the registration rollers start turning, the friction of the moving paper as it is pulled from under the feed roller causes the feed roller to start turning again. As the trailing edge clears the leading edge of the paper stack, the feed roller catches on the next sheet and starts moving it forward. The feed roller stops turning when the trailing edge of the first sheet leaves the feed roller. The leading edge of the next sheet is then held ready for feeding between the friction pad and feed roller.

Sometimes sheets of paper tend to stick together (perhaps due to static electricity or poorly cut edges). When this happens, two sheets may feed between the feed roller and friction pad. However, the coefficient of friction between the friction pad and lower sheet is much greater than that between the two sheets of paper; so, the top sheet slips through while the pad holds the lower sheet.

The friction pad holder is mounted on one end of the swivel plate with a swivel screw; so, it automatically appiies even pressure against the feed roller and the copy paper. The pad pressure spring on the other end of the swivel plate (reverse side) provides the pressure. After removing the cassette, the pad pressure is released.

PAPER LIFT MECHANISM

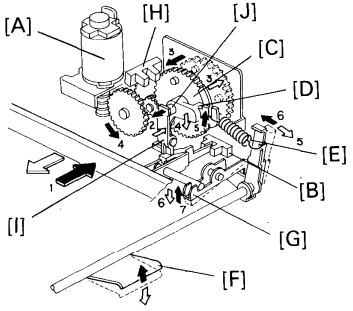
1. First and Second Feed Stations

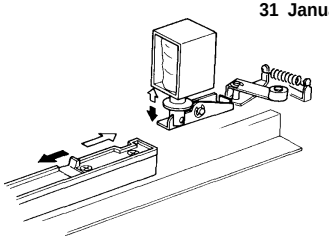


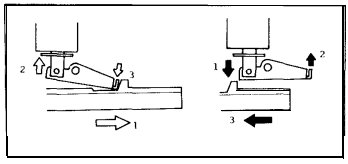
When a cassette is inserted into the copier, the curved release guides on the sides of the cassette press against the rollers on the release levers [A] and force the release levers down. The release levers rotate the cassette arm shaft [B], moving the cassette arm down and out of the way. When the cassette is fully seated, the release guides allow the release levers to move back up. The cassette arm [C] presses up the cassette bottom plate [D] until the paper contacts the paper feed roller.

To prevent copy paper from multi-feeding or jamming, the spring [E] pressure is adjustable.

2. **Third Feed Station**







A small dc motor [A] lifts the bottom plate of the third (internal) cassette.

When the cassette tray is fully inserted, actuating the cassette tray sensor [B], the lift motor rotates to lift the cassette bottom plate. As the motor turns, a pin on the lift gear [C] rotates the actuator lever [D] counterclockwise. The actuator lever pulls the cassette arm spring [E], which raises the cassette arm [F]. Simultaneously, the lock lever [G] raises and locks the cassette tray to prevent the bottom plate from crushing the cassette arm when pulling out the cassette tray. The motor stops when the lift sensor [H] detects the actuator lever.

When the cassette tray is pulled out, the release lever [1] pushes the lift gear shaft [J], causing the lift gear to move inward against the pressure of the lift gear spring. When this happens, the actuator lever is released, the cassette arm drops, and the lock lever is released.

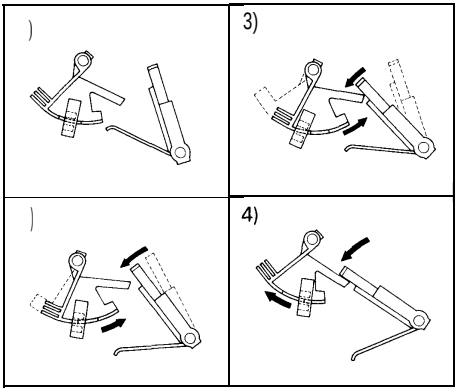
- Lock Mechanism -

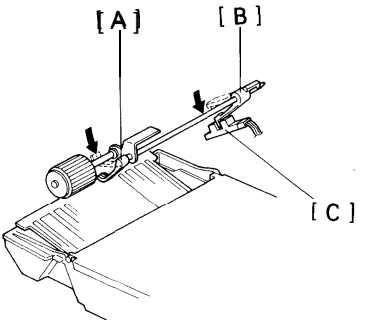
The lock solenoid actuates the lock mechanism. The lock mechanism holds the third feed station in position at the following times: 1) while the third feed station is in use, 2) when a jam occurs and the third feed station is selected, and 3) when the lift motor is actuated. The solenoid is deactuated when another feed station is selected or when the front door is opened.

- Lift Motor -

The lift motor is raised when the third feed station is first set. It is lowered completely at paper end to ensure there is no damage to the paper end sensor's feeler, and partially during a paper jam from the third feed station to release pressure on the paper.

3. **Paper End Detection**





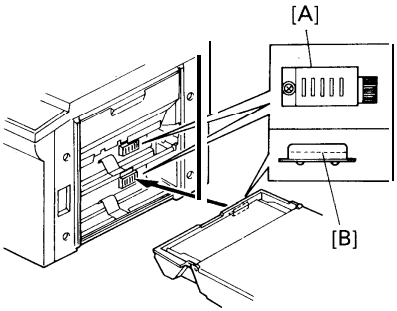
When a cassette or the LCT runs out of paper, the paper end feeler [A] drops through a slot in the cassette (or LCT) bottom plate. The paper end actuator [B], which is on the same shaft as the paper end feeler, pivots into the detector (photointerrupter). The paper end sensor [C] then sends a HIGH signal to the CPU, informing it that the cassette is empty. Then the Add Paper indicator turns on, the Print key turns red, and the machine stops after the copy is finished.

For conditions apply for the paper end sensor in the cassette tray:

1) When paper is in the cassette tray and the motor has raised the bottom palate to the feed position, the slot of the actuator is between the photosensor elements [Fig. 1], and the sensor output is LOW.
2) When a jam occurs, the lift motor rotates in reverse, lowering the cassette arm lever along with the bottom plate. This pivots the actuator to the right. The motor stops when the solid section of the actuator moves between the photosensor elements (LOW to HIGH) [FIG. 4]
3) At paper end, the actuator pivots to the right and the solid section of the actuator moves between the photosensor elements (LOW to HIGH) as shown [Fig. 2].
   The lift motor then begins to rotate in reverse lowering the cassette arm lever which pushes down on the actuator as shown [Fig. 3].
4) The motor stops rotating after the sensor goes from HIGH to LOW to HIGH as shown [Fig. 4].

At paper end, the tray lift motor lowers the bottom plate to prevent damage to the sensor's feeler.

PAPER SIZE DETECTION



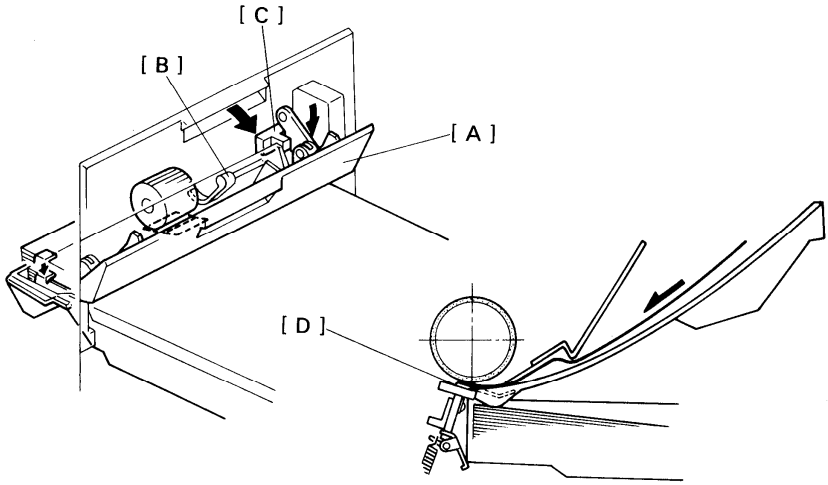
Paper Size	Sensor No. 5 4 3 2 1	Operation Panel Indication 220V	115V
A3	1 0 0 0 0	A3	*
B4	1 1 0 0 0	B4	*
A4 sidewise	0 0 1 0 0	A4	*
A4 lengthwise	1 0 1 0 0	A4R	*
B5 sidewise	0 1 1 0 0	*	*
B5 lengthwise	1 1 1 0 0	*	*
A5 sidewise	0 0 0 1 0	A5	*
A5 lengthwise	1 0 0 1 0	A5R	*
B6 sidewise	0 1 0 1 0	*	*
B6 lengthwise	1 1 0 1 0	*	*
Return Post Card	0 0 1 1 0	*	*
Post Card	1 0 1 1 0	*	*
11" x 17"	0 0 0 0 1	*	11" x 17"
11" x 8-1/2"	1 0 0 0 1	*	11" x 8-1/2"
11" x 15"	0 1 0 0 1	*	11" x 15"
10" x 14"	1 1 0 0 1	*	*
8-1/2" x 14"	0 0 1 0 1	*	8-1/2" x 14"
8-1/2" x 13"	1 0 1 0 1	F4	*
8-1/2" x 11"	0 1 1 0 1	*	8-1/2" x 11" R
8-1/2" x 5-1/2"	1 1 1 0 1	*	8-1/2" x 5-1/2
8-1/2" x 13" (14")	0 0 0 1 1	*	*
8" x 13" (14")	1 0 0 1 1	F	*
8" x 10-1/2"	0 1 0 1 1	*	*
8" x 10"	1 1 0 1 1	*	*
5-1/2" x 8-1/2"	0 0 1 1 1	*	8-1/2" x 5-1/2
No Cassette	1 1 1 1 1	*	*

1: Notch Low (0V)
0: No Notch High (5V)

[Actuator Plate Combination Table]

Five microswitches for the first and second feed stations in the cassette entrance detect the cassette tray paper size (For the third feed station, an array of five photointerrupters is used). The paper size switches (photointerrupters) [A] are actuated by a plate on the front of the cassette. Each paper size has its own unique combination of notches in the actuator plate [B]. The CPU reads which microswitches (photointerrupters) have been deactivated (HIGH - LOW) by the actuator plate to determine which size cassette has been inserted.

MANUAL FEED

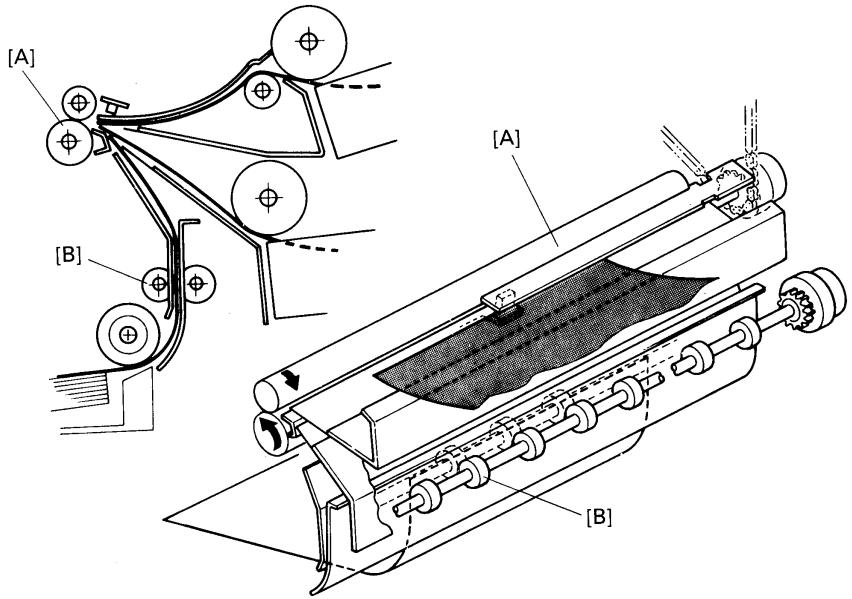


The manual feed table [A] uses the same feed mechanism as the first cassette. When the manual feed table is opened, it forces down the copy paper in the first cassette, clearing the way for manual feed. A slot in the manual feed table allows the paper end feeler [B] to drop down and the Add Paper indicator turns on. At the same time the rear arm of the tray activates the manual feed sensor [C] and the Manual Feed indicator turns on.

When the manual feed table is opened and the copy paper in the first cassette is forced down, the top sheet of paper still remains between the paper feed roller and the friction pad [D]. The spring plate installed on the manual feed table is positioned between the paper feed roller and the top sheet of paper, preventing the top sheet of paper from being fed with the manual feed paper.

The first cassette must be installed to use manual feed. If it is not, the friction pad will separate from the feed roller, making paper feed impossible. If the manual feed table is opened without the first cassette inserted, the Manual Feed indicator and the First Cassette indicator blink and the Start key turns red.

FEED AND REGISTRATION TIMING

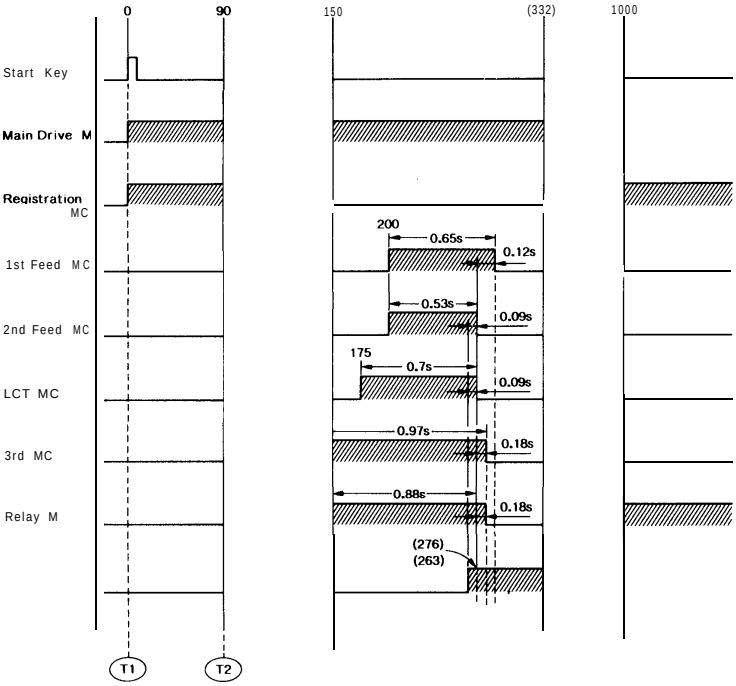


1. Relay Rollers

Paper feed timing varies depending on the feed station selected. The third feed station is too far from the registration rollers [A] for the feed roller to transport the paper to the registration rollers. A set of relay rollers [B] assists in moving the paper from the third feed station to the registration rollers.

2. **Roller Timing**

The following table shows the timing of the rollers used with the various feed stations.



T1 ----- If the cleaning solenoid is on and the Start key is pressed, then the main motor and the registration clutch turn on.

T2 ----- The selected paper feed station's paper feed clutch turns on 0.63 second after the Start key is pressed. At the same time, the registration clutch turns off.

T3 ----- If the 3rd paper feed station is selected, the relay clutch turns on at the same time as the 3rd paper feed clutch.

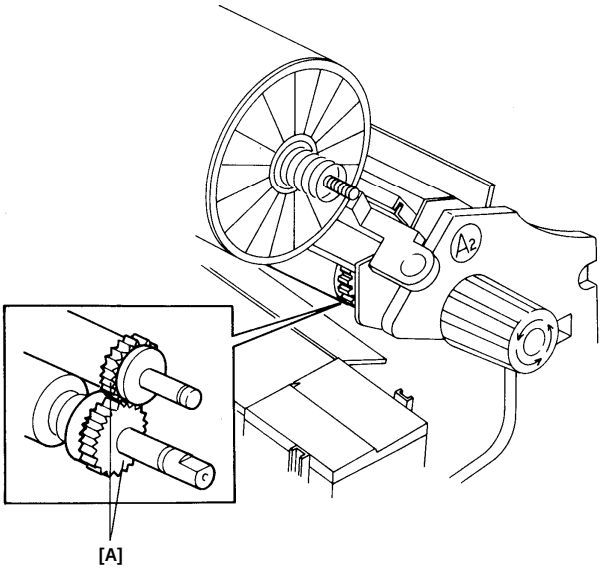
T4 ----- If the 2nd paper feed station is selected, the 2nd paper feed clutch and the LCT clutch turn off 0.09 second after the registration sensor turns on.

T5 ----- If the 3rd paper feed station is selected, the 3rd paper feed clutch and the relay clutch turn off 0.18 (depends on the paper size) second after the registration sensor turns on.

T6 ----- If the 1st paper feed station is selected, the 1st paper feed clutch turns off 0.12 second after the registration clutch turns on.

T7 ----- The registration start signal appears at the 1,000th pulse. This compensates for differences in the length of the paper paths for each feed station.

3. Registration

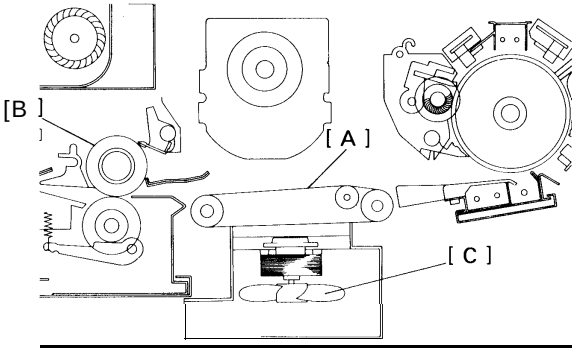


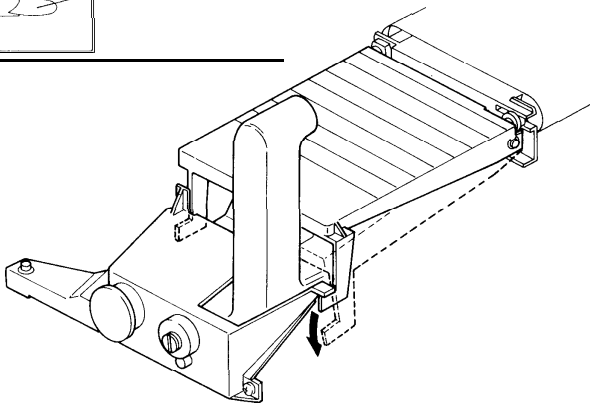
After the leading edge of the copy paper reaches the registration rollers, the optics CPU sends the registration start signal (1,000th pulse) to the main CPU. At this time, the main CPU energizes the registration clutch to feed the copy paper for image transfer. The upper and lower registration roller gears [A] rotate together. This prevents paper from slipping on the rollers.

SERVICE CALL CONDITIONS

Self-diagnostic code 41:
Lift Motor Not off
Code 41 is displayed if the lift motor continues rotating more than 20 seconds.

PAPER TRANSPORT





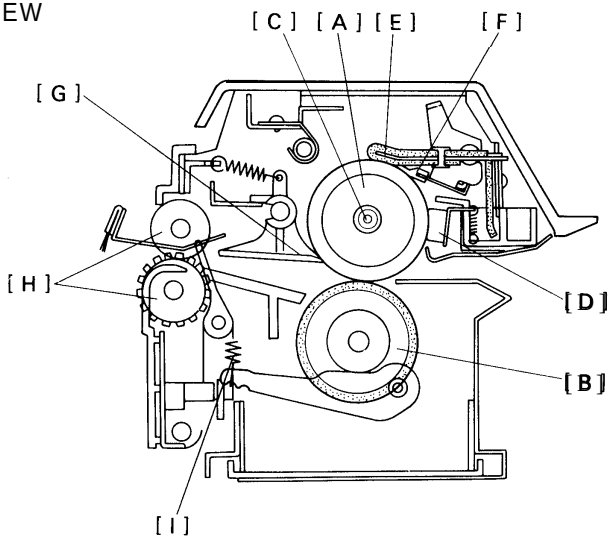
The copy paper rides on the transport belt [A] to the fusing unit [B].

A vacuum fan [C] holds the paper firmly against the belt so there is enough friction between the paper and the belt for smooth transportation. The transport belt is directly gear driven (no clutch); so, it turns constantly when the main motor is on.

The front part of the transport unit is hinged and can be pressed down for easy jam removal.

IMAGE FUSING AND PAPER EXIT

OVERVIEW



Two fusing rollers, which apply heat and pressure, fuse the image to the copy paper. The hot roller [A] is made of teflon, and the pressure roller [B] is made of silicone rubber with a teflon tube coating. Pressure is constantly applied between the rollers. There is no pressure release mechanism.

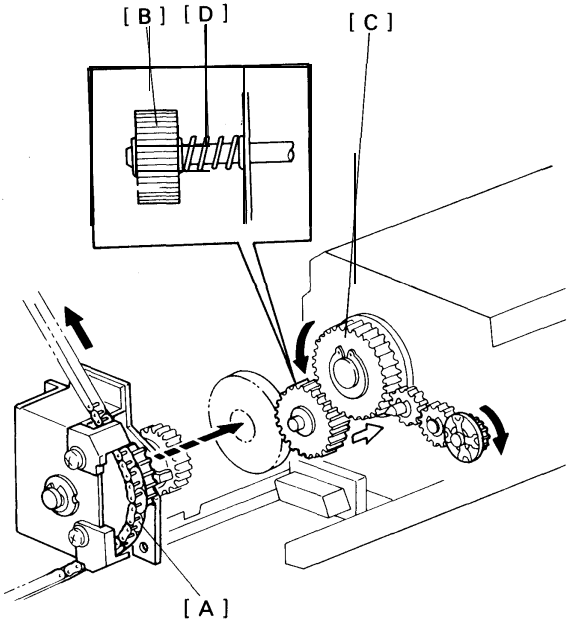
The fusing lamp [C], which is located at the hot roller axis, is turned on and off to maintain the operating temperature. The temperature control circuit monitors the hot roller surface temperature through a thermistor [D].

The oil supply pad [E] applies silicone oil to the hot roller. The oil blade [F] then spreads the oil evenly across the hot roller. The oil reduces the adhesion between paper and the hot roller (reducing misfeeds), reduces paper curl, and helps to keep the roller clean by reducing the amount of toner transferred to the hot roller surface. The oil supply pad also works as the hot roller cleaning pad.

The hot roller strippers [G] separate the copy from the hot roller and direct it to the fusing exit rollers [H].

The lock position of the pressure lever tension springs [1] adjusts the roller pressure.

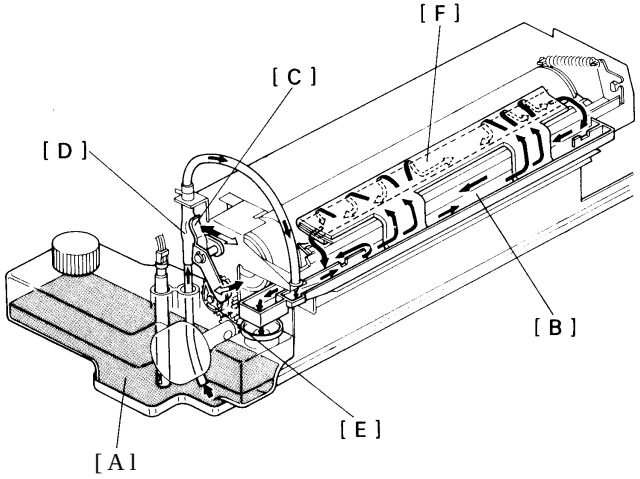
FUSING DRIVE MECHANISM



The fusing drive gear [A] turns the release gear [B] which drives the hot roller gear [C]. Rotation passes from the hot roller gear through two idle gears to the exit rollers. The friction between the hot roller and the pressure roller drives the pressure roller.

The release gear spring [D] allows the release gear to move in and out. This prevents the gears from being damaged if they should not engage correctly when the fusing unit is set. Also, by pulling the fusing knob out slightly, the operator can disengage the release gear and the fusing drive gear so that the fusing rollers can be turned easily for removing misfeeds.

OIL SUPPLY AND CLEANING



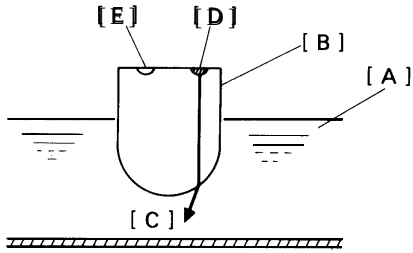
Silicone oil is applied to the hot roller to help prevent toner and paper from sticking to the hot roller, to reduce paper curl, and to assist roller cleaning.

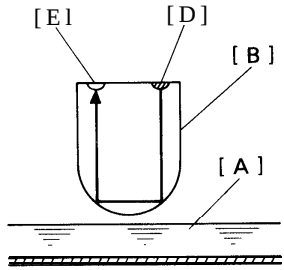
A small one-way valve moves the oil from the oil tank [A] (capacity 580 cc) to the oil sump [B]. The oil pump lever [C] alternately presses and releases the rubber sleeve [D] between the valves as the oil cam [E] turns,

The felt wick soaks up oil and supplies it to the top of the oil supply pad [F]. The oil supply pad then applies the oil to the hot roller as it turns. The oil blade spreads and levels the oil on the hot roller. Excess oil flows along the blade toward the ends of the roller. At the ends, oil skimmers scrape off the excess oil and return it to the oil sump. Oil flows out through a hole in the bottom of the oil sump and returns to the oil tank.

The oil supply pad both distributes oil to the hot roller and removes toner and foreign matter from the hot roller surface.

OIL END SENSOR



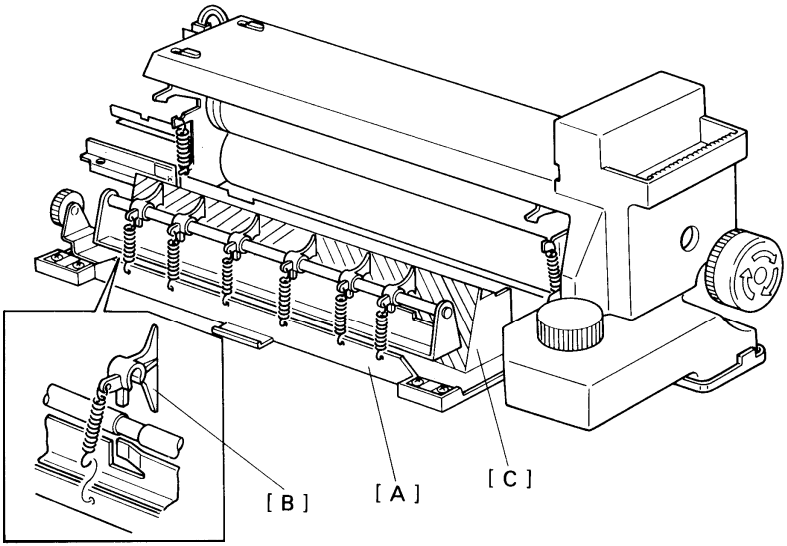


Oil end detection is based on the difference between the index of refraction of air and the index of refraction of silicone oil.

The index of refraction of silicone oil (1.40) is very near that of the sensor casing (1.49); so, the oil-casing interface has a very large critical angle. As a result, when oil [A] covers the sensor [B], light [C] from the LED [D] is only refracted slightly at the boundary between the casing and the oil. The phototransistor [E] stays off.

However, the index of refraction of air is much lower (1 .00). So, the critical angle for the air-casing interface is much less than that of the oil-casing interface. Light from the LED strikes the air-casing interface at an angle greater than the critical angle. So, when oil runs out, light from the LED reflects instead of refracting and activates the phototransistor.

FUSING EXIT ASSEMBLY

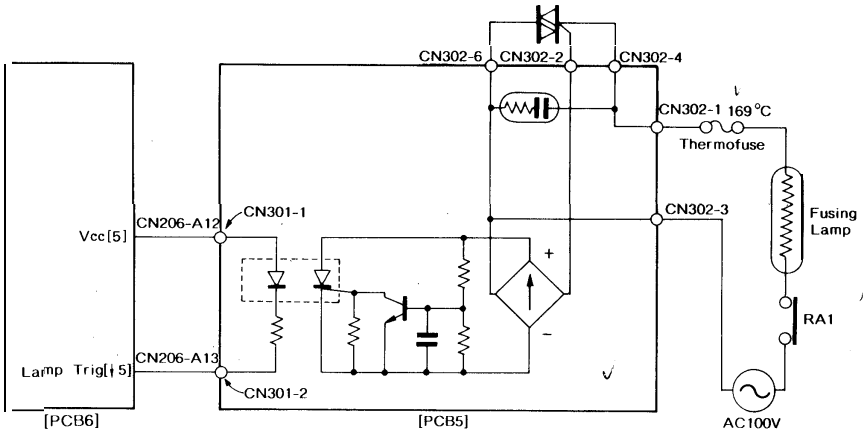


The fusing exit assembly [A] includes the fusing roller strippers [B], the lower fusing exit guide [C], the exit sensor, and the antistatic brush.

The hot roller strippers prevent copy paper from wrapping around the hot roller. They slide between the paper and the roller, and then direct the paper to the fusing exit rollers.

The lower fusing exit guide prevents the copy paper from wrapping around the pressure roller. Although the lower fusing exit guide is not touching the pressure roller, it will catch the leading edge of the copy paper due to the face curl of the paper. (The face curl is caused by the pressure between the teflon hot roller and silicone rubber teflon coated pressure roller.)

FUSING CONTROL

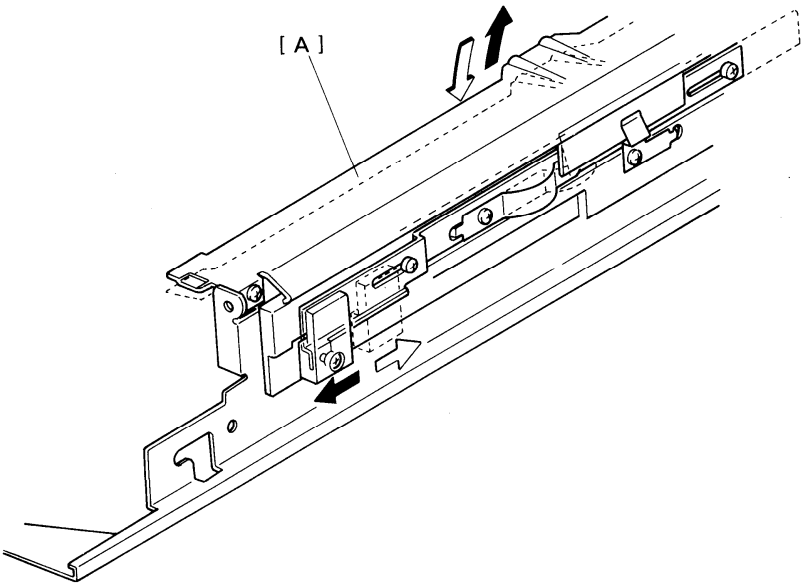


The main CPU controls the fusing lamp. The main CPU monitors the temperature of the fusing roller through a thermistor.

The main CPU sends the fusing lamp trigger signal (LOW) until the temperature of the fusing roller reaches 180°C (ready temperature). The LOW trigger signal turns on a photothyristor, which turns on the triac controlling the ac voltage to the lamp.

The main CPU controls the fusing temperature within 180°C ± 3°C. This control range can be changed by SP # 49.

ENTRANCE GUIDE



The entrance guide [A] of this machine is adjustable for thick and thin paper. With thin paper, the entrance guide should be set in the upper position. This slightly lengthens the paper path and prevents the paper from creasing in the fusing unit. With thick paper, the entrance guide should be set in the lower position. This is because thick paper does not bend easily and is therefore less prone to creasing. Also, the lower setting allows more direct access to the gap between the fusing and pressure rollers. This prevents thick paper from buckling against the fusing roller (which could cause blurring at the leading edge of the copy).

The angle of the entrance guide is adjustable (about 1 mm of play) as shown by the arrows in the illustration.

SERVICE CALL CONDITIONS

Self-diagnostic Code 53:
Thermistor Open
The main CPU checks the conductivity of the thermistor. Code 53 is displayed if the thermistor circuit is open.

Self-diagnostic Code 54:
No Warm-up Signal
Code 54 is displayed if the hot roller does not reach the ready temperature within 8 minutes after the power is turned on.

Self-diagnostic Code 55:
Overheat
The main CPU checks the conductivity of the thermistor. Code 55 is displayed if the resistance of the thermistor becomes too low, This occurs if the hot roller temperature is in the 200"- 24°C range.

Self-diagnostic Code 56:
Temperature Too Low
Code 56 is displayed if the CPU detects that the temperature of the hot roller is less than 150°C after the CPU detects the ready signal.

SECTION 3

INSTALLATION

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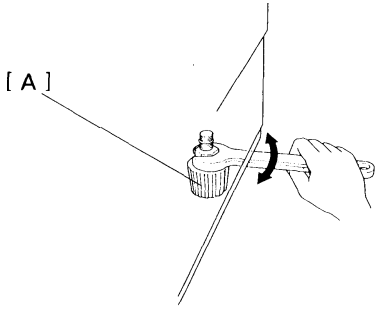
INSTALLATION REQUIREMENTS

ENVIRONMENT

1. Temperature Range: 10°C to 30°C (50°F to 86°F)
2. Humidity Range: 15% to 90% RH
3. Ambient Illumination: Less than 1,500 lux (Do not expose to direct sunlight.)
4. Ventilation: Room air should turn over at least 3 times/hour.
5. Ambient Dust: Less than 0.15 mg/m^3 (4x 10^{-3} oz/yd^3)
6. Room Size: More than 10 m^3 (13.4 yd^3)
7. If the installation place is air-conditioned or heated, place the machine:
   a. Where it will not be subjected to sudden temperature changes.
   b. Where it will not be directly exposed to cool air from an air conditioner in the summer.
   c. Where it will not be directly exposed to reflected heat from a space heater in winter.
8. Avoid placing the copier in an area filled with corrosive gas.
9. Avoid any area higher than 2,000 meters (6,500 feet) above sea level.
10. Place the copier on a strong and level base.
11. Avoid any area where the copier may be subjected to frequent strong vibration.

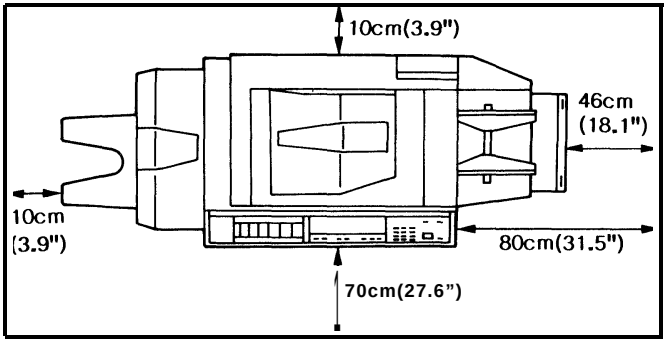
MACHINE LEVEL



1. Front to back: Within 5 mm (0.2") of level
2. Right to left: Within 5 mm (0.2") of level

Place the machine on a table and screw the leveling foot [A] up or down to level the machine. Use a leveling gauge if necessary.

MINIMUM SPACE REQUIREMENT



1. Front :70 cm (27.6")
2. Back :10 cm (3.9")
3. Right :80 cm (31 .5")
4. Left :10 cm (3.9")

POWER REQUIREMENT

1. Input voltage level:

   110V/60Hz : More than 15A
   115V/60Hz : More than 15A
   220V/50Hz : More than 8A
   220V/60Hz : More than 8A
   240V/50Hz : More than 8A

2. Permissible voltage fluctuation: ± 10%

3. Permissible extension cord: At least 300V, 30A capacity and less than 5 meters (16.4 ft) long.

4. Do not set anything on the power cord.

NOTE: - Be sure to ground the machine. (Do not connect the grounding wire to a gas pipe.)

- Make sure the plug is firmly inserted in the outlet.

- Avoid multi-wiring.

COPIER INSTALLATION

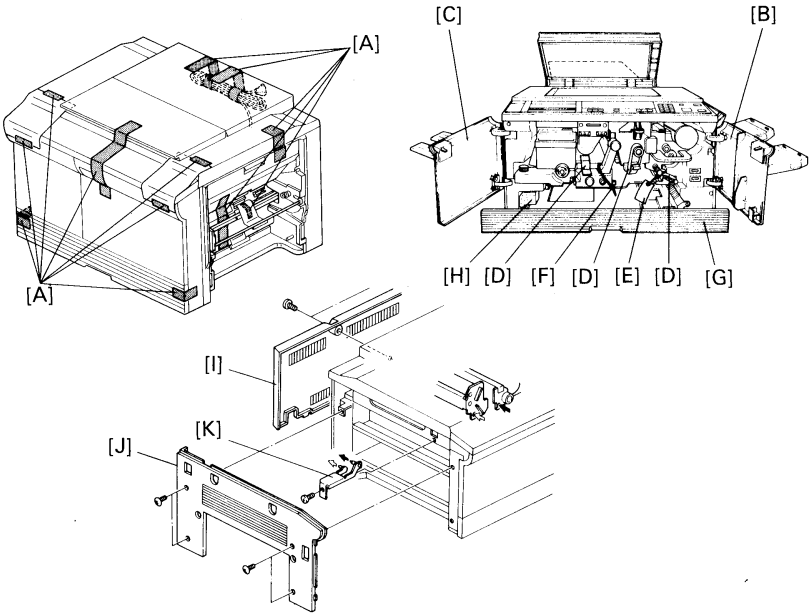
1. Accessory Check

Check the quantity and condition of the accessories in the box according to the following list:

1. Installation Procedure (1 15V - English only/220V - five languages)	1
2. New Equipment Condition Report (1 15V - English only/220V - five languages)	1
3. Envelope (1 15V only)	1
4. Cassette - Large	
America, Europe, Saudi Arabia, Philippines	1
Asia, Taiwan	2
5. Cassette - Small	
America, Europe, Saudi Arabia, Philippines, Taiwan	2
Asia	1
6. Receiving Tray	1
7. Original Holder	1
8. Operating Instructions (1 15V - English only/220V - five languages)	1
9. Operating Instruction Cards (115V - English only/220V - five languages)	1
10. Multilingual Decals (220/240V only)	1 set
11. Sort/Stack Key Top	1
12. Sort/Stack Key Cover	1
13. Exposure Glass Holder (European version only)	2
14. Editing Sheet	1

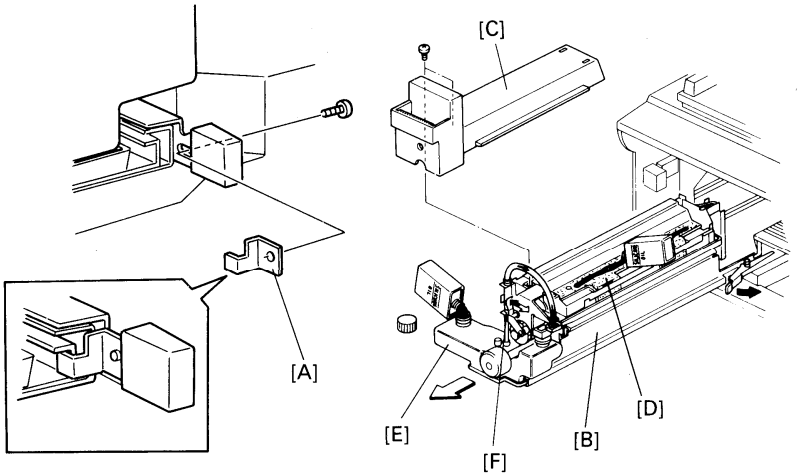
NOTE : - Save the Sort/Stack key top and cover for the Sorter installation.
- Save the exposure glass holders for DF installation.

2. **Installation Procedure**



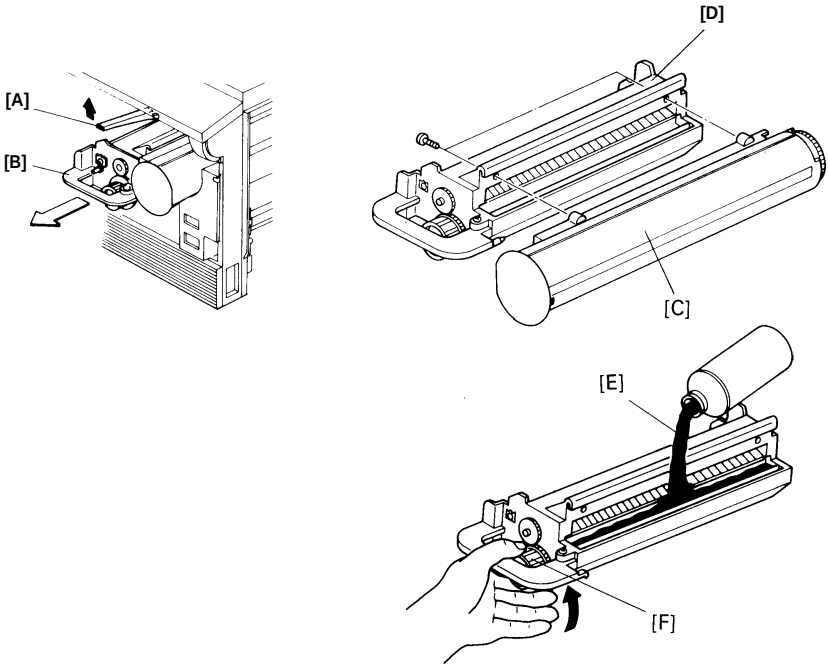
1. Remove the shipping tapes [A] from the copier as shown.
2. Open the right and the left front doors [B and C], remove the shipping tapes [D] and the wedge [E] between the registration rollers, and cut the cable tie [F] securing the toner collection bottle as shown.
3. Pull out the cassette tray [G] and remove the foam rubber [H].
4. Remove the rear cover [1] (2 screws).
5. Remove the left cover [J] (4 screws).
6. Remove the scanner lock plate [K] (1 screw), then reinstall the left and rear covers.

NOTE : Save the scanner lock plate for future use.

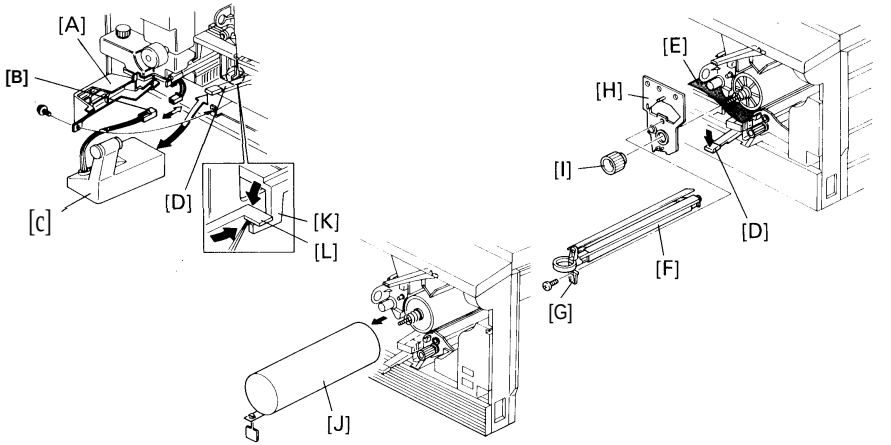


NOTE: (220/240V machines only)
Remove the lock lever stopper [A] (1 screw).

7. Pull out the fusing unit [B] to the lock position and remove the fusing unit cover [C].
8. Prime the oil supply pad [D] with silicone oil.
9. Fill the oil tank [E] with silicone oil.
10. Manually operate the oil pump lever [F] and confirm the proper operation and condition of the silicone oil supply system.
11. Reassemble the fusing unit and return it to its original position.



12. Raise the development lock lever [A] and pull out the development unit [B]. Place the unit on a clean sheet of paper.
13. Separate the toner tank [C] from the development unit [D] (2 screws).
14. Pour one bottle of developer [E] into the development unit while turning the knob [F] counterclockwise to distribute the developer.
15. Remount the toner tank on the development unit.



16. Swing the toner collection bottle cover [A] to the left (1 screw) after pulling the cassette tray out, and then unplug the toner overflow sensor connector [B].
17. Remove the toner collection bottle [C] and lower the T/S corona unit [D].
18. Place a sheet of paper [E] over the T/S corona unit.
19. Remove the charge corona unit [F] together with the wire cleaner [G] (1 screw).
20. Remove the drum stay [H] (1 knob and 1 screw).

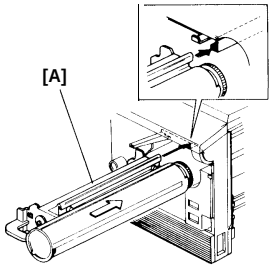
NOTE : The drum stay knob [1] is reverse threaded.

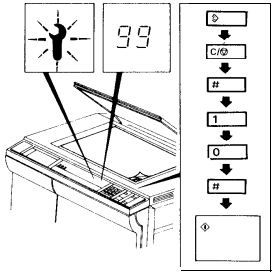
21. Pull out the drum protective sleeve [J].

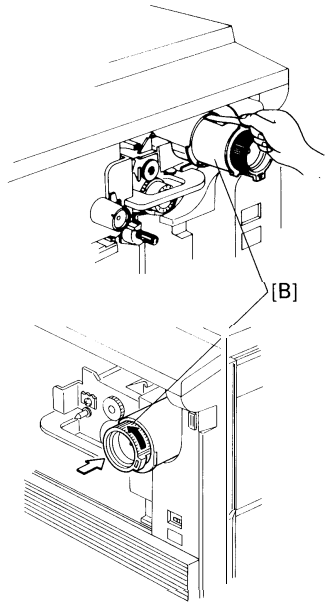
NOTE : Save the drum protective sleeve for future use when servicing the copier.

22. Reinstall all units.

NOTE : - Make sure that the wire cleaner is properly positioned.
Make sure that the T/S corona unit is in its original position.
Make sure that the hooks of the transport plate [K] are positioned underneath the bottle cover **[L].**
Make sure that the overflow sensor connector is plugged in.







23. Reinstall the development unit.

CAUTION : When Installing the development unit [A], be sure the development unit rail is properly engaged with the unit guide rail on the copier.

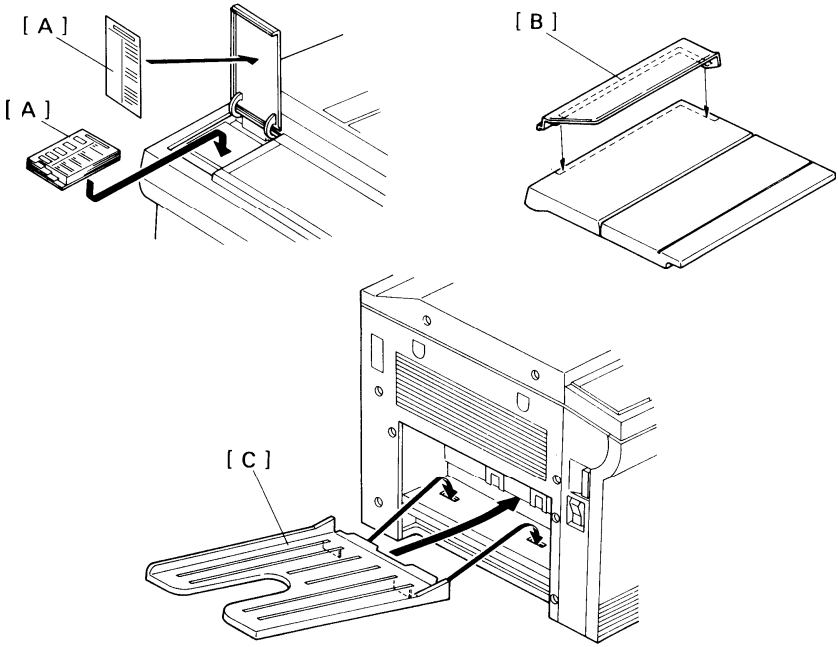
24. Install one toner cartridge [B].

NOTE: Before installing the toner cartridge, shake it well to distribute the toner evenly inside the cartridge.
Confirm that the toner cartridge gear is properly engaged by attempting to rotate the cartridge counterclockwise. When the toner cartridge gear is properly engaged, the toner cartridge will not rotate freely.

25. Plug in the machine and turn on the main switch, then place a few sheets of white paper (A3 or 11 “xl 7“) on the exposure glass and lower the platen cover.

26. Press the Mode Clear Key, C/S Key, Enter Key in this order. The Service Call indicator will blink.

27. Enter “IO” using the numeral Keys, then press the Enter key.
As “99” will be indicated in the copy counter automatically, press the Start key for drum conditioning after the warm up period is completed.



28. After the machine stops, press the Mode Clear key.
29. Adhere the Operating Instruction Cards [A] over the DIP Switch cover using the two-sided tape as shown.
30. Adhere the original holder [B] on the platen cover using the two-sided tape and install the receiving tray [C].
31. Load paper into the cassettes and the check machine operation and copy quality.
32. Fill out the New Equipment Condition Report.

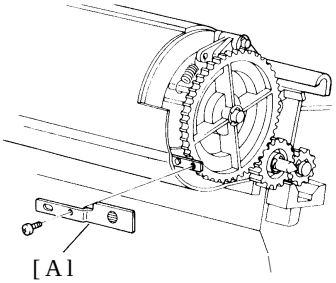
COLOR UNIT INSTALLATION

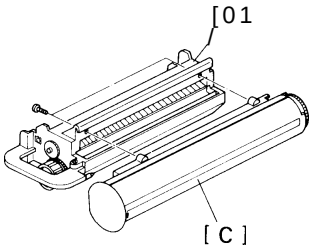
1. **Accessory Check**

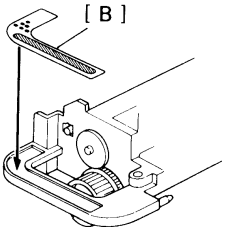
Check the quantity and condition of the accessories in the box according to the following list:

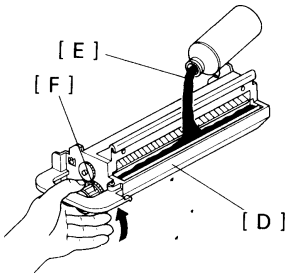
1. Actuator - Red	1
2. Actuator - Blue	1
3. Actuator - Green	1
4. Screw - M3 x 4	1
5. Color Decal Sheet	1

2. Installation Procedure







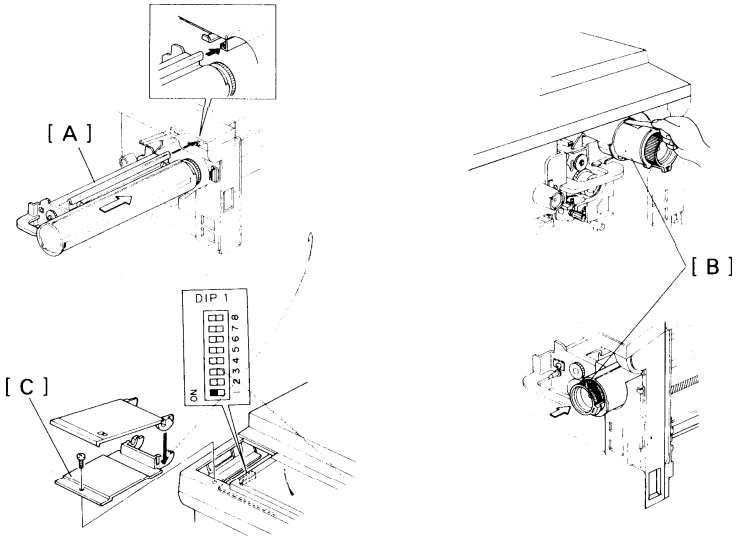


NOTE - The color development unit should be installed after drum conditioning is finished. (See the copier installation procedure.) The following procedure should be done when the color developer is replaced.

1. Install the color actuator [A] on the color development unit (1 screw),

NOTE: Each actuator has a colored sticker. Install the appropriate actuator.

2. Stick the appropriate decal [B] on the development unit handle.
3. Separate the toner tank [C] from the development unit [D] (2 screws).
4. Pour one bottle of color developer [E] into the development unit while turning the knob [F] counterclockwise to distribute the developer,

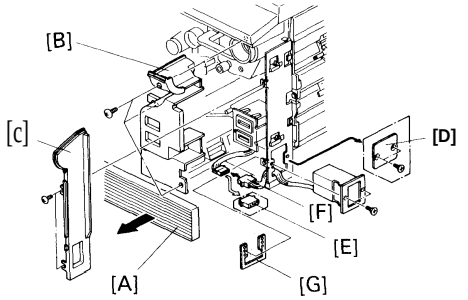


5. Remount the toner tank on the development unit.
6. Install a color development unit [A].

When installing the color development unit, be sure the development unit rail is properiy engaged with the unit guide rail on the copier.

7. Install a color toner cartridge [B].
8. Remove the DIP switch cover [C] (1 screw) and turn on DIP SW No. 1.
9. Plug in the machine and turn on the main switch. Confirm that the color toner indicator is displayed on the operation panel.
10. Press the Enter/Recall key. “20” will be displayed on the copy counter.
11. Put a few sheets of white paper (A3 or 11” x 17“) on the exposure glass.
12. Lower the platen cover.
13. After the warn up period is completed, press the Start key.
14. Turn off the main switch and the DIP switch.
15. Reinstall the DIP switch cover (1 screw).

KEY COUNTER HOLDER INSTALLATION



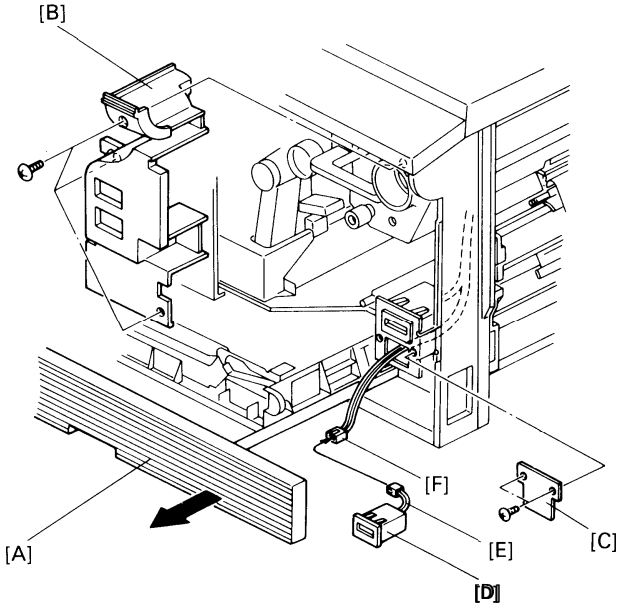
NOTE: Three types of counters recommended for this copier (Ricoh, Hecon, and Hengstler key counters).

1. Open the right front door.
2. Pull out the cassette tray [A].
3. Remove the right inner cover [B] (3 screws).
4. Remove the right front door.
5. Remove the front right side cover [C] (2 screws).
6. Remove the cover plate [D] (2 screws).
7. Remove the shorting plug [E] from the 4P key counter connector.
8. Connect the 4P connector of the key counter holder [F] to the key counter harness through the key counter access hole.
9. Hold the fixing plate on the inside of the key counter bracket [G] and insert the key counter holder.
10. Align the holes in the fixing plate with the mounting holes of key counter holder and secure the key counter holder.

NOTE: The fixing plate has three sets of holes. Make sure to use the holes that match the type of counter when installing.

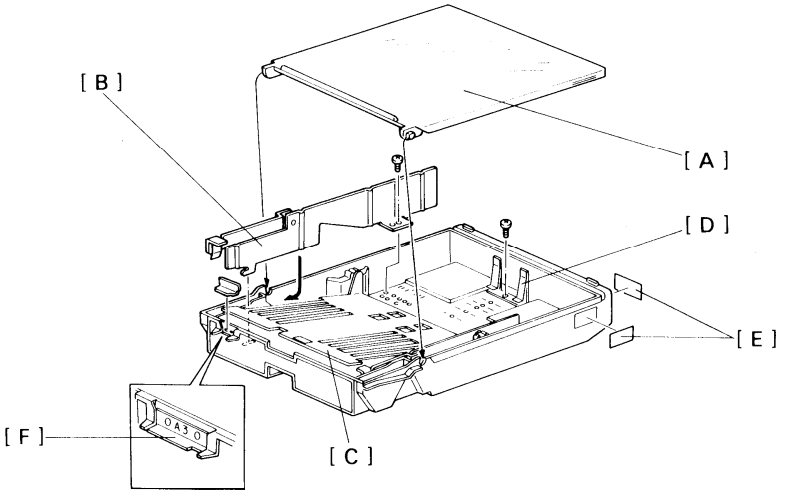
11. Reinstall all covers.

ACCESSORY COUNTER INSTALLATION



1. Open the right front door.
2. Pull out the cassette tray [A].
3. Remove the right inner cover [B] (3 screws).
4. Remove the accessory counter cover plate [C] (2 screws).
5. Connect the 2p connector [D] on the accessory connector to the counter harness [E].
6. Push the accessory counter [F] into the space provided until it locks.
7. Reinstall the right inner cover.

CASSETTE MODIFICATION

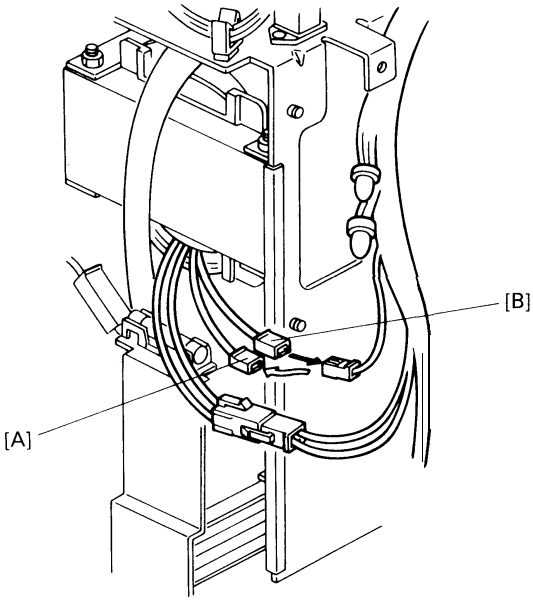


1. Take off the cassette cover [A].
2. Remove the side fences [B] (1 screw each) and the bottom plate [C] (2 positioning pins).
3. Re-position the rear fence [D] in the desired paper size position (1 screw).

NOTE: Paper size positions are shown on the inside of the cassette.

4. Reinstall the bottom plate confirming the positioning pins have clicked into place.
5. Reinstall the side fences in the desired paper size position.
6. Attach the proper paper size decals [E] on the cassette at the positions shown.
7. Insert the actuator plate [F] in the slot on the front of the cassette.

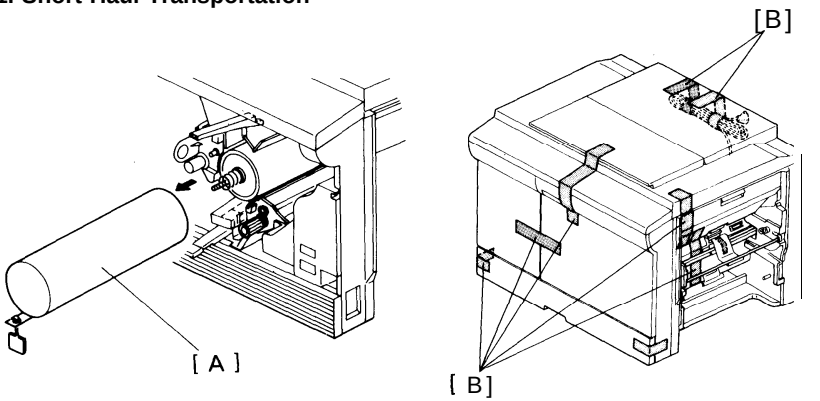
MODIFYING MAIN TRANSFORMER VOLTAGE (220V TO 240V)



1. Remove the rear cover (2 screws).
2. Disconnect the 220V connector [A] (White: 1 P).
3. Connect the 240V connector [B] (Red: 1P).
4. Reinstall the rear cover.

PREPARATION FOR TRANSPORTING THE COPIER

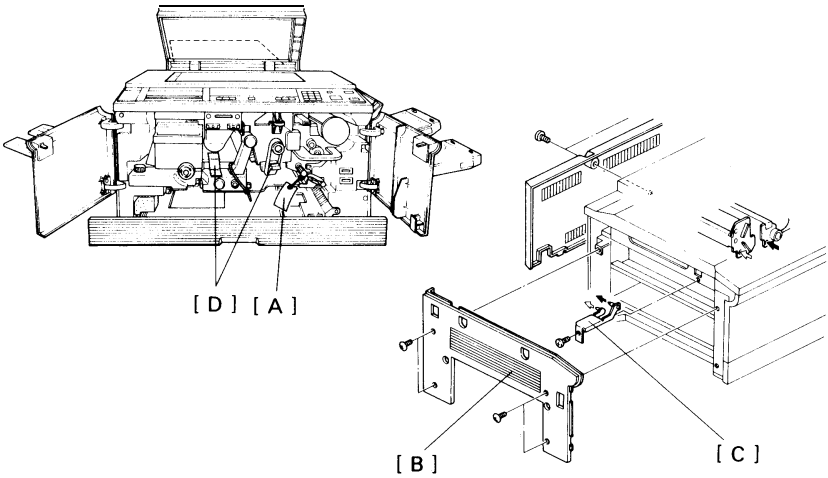
1. Short Haul Transportation



The copier may be seriously damaged if it is moved without proper preparation. Before moving the copier from its place of installation, be sure to prepare it for transportation as follows:

1. Insert the drum protective sleeve [A].
2. Re-install the development unit.
3. Re-install the drum stay and charge corona unit.
4. Secure the following items with tape [B]:
   - Manual feed table
   - Platen cover or document feeder
   - Power Supply cord (roll up first)
   - Cassette tray front cover and front doors
5. Remove the sorter to prevent damage to the bins.
6. Remove the cassettes.
7. Remove the original table from the document feeder.
8. Remove the LCT if it is installed in the 2nd feed station.

2. **Long Haul Transportation By Vehicle**



If the machine is to be transported by vehicle, do the following steps after you have completed the short haul procedure.

1. Remove the developer from the development unit.
2. Place a wedge [A] between the registration rollers.
3. Remove the left cover [B] and install the scanner lock plate [C].

NOTE: Confirm that the scanner is at the home position.

4. Secure the following items with tape [D]:

   - T/S corona release lever to the drum stay knob
   - Transport plate to the toner collection bottle cover
   - 1st and 2nd feed guide plates

5. Remove the sorter and secure the following items with tape:

   - Top cover
   - Jam clearing tray
   - Bins--tape the right and left edges of the spacers together.

6. Secure the LCT covers and power supply cord with tape.

SECTION 4

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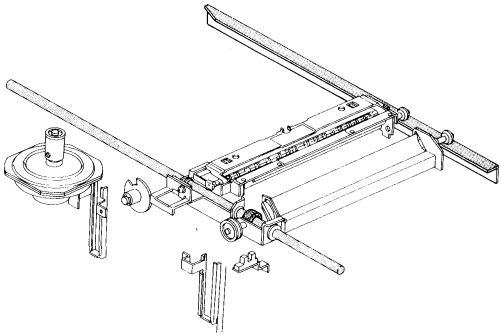
PM TABLE

C: Clean R: Replace L: Lubricate

ITEM	EM	60K	120K	180K	240K	NOTES
OPTICS						
1. Mirrors, lens, reflectors, toner shield glass, ADS, OW/OL Sensors	C	C	C	C	C	Silicone cloth or water (cotton pad), blower brush
2. Exposure glass	C	C	C	C	C	Alcohol or water
3. Platen cover sheet	C	C	C	C	C	Alcohol or water (replace If necessary)
4. Scanner guide rod and plate		L	L	L	L	Launa oil or equivalent Refer to NOTE 1.
5. Guide rod felt					L	Launa oil or equivalent Refer to NOTE 1.
PAPER FEED						
6. Paper feed roller	C		R		R	Water
7. Friction pad	C		R		R	Water. Refer to NOTE 2.
8. Paper feed guide plate		C	C	C	C	
9. Registration sensor		C	C	C	C	Blower brush
10. Cassette bottom plate pad		C	C	C	C	Alcohol or water
11. Registration Rollers		C	C	C	C	Alcohol or water
AROUND DRUM						
12. Corona wires	C		R		R	Dry cloth
13, Wire cleaner		R	R	R	R	
14. End blocks and casing	C	C	C	C	C	Dry cloth
15. Transfer guide plate		C	C	C	C	Dry cloth
16. Pre-Transfer Lamp	C	C	C	C	C	Dry cloth, discharge before installation.
17. Quenching Lamp	C	C	C	C	C	Dry cloth, discharge before installation.
18. ID sensor	C	C	C	C	C	Blower brush
19. Erase lamp unit		C	C	C	C	Dry cloth
CLEANING UNIT						
20. Cleaning blade		R	R	R	R	Dust with setting powder
21. Cleaning seal		C	C	C	C	Replace if necessary

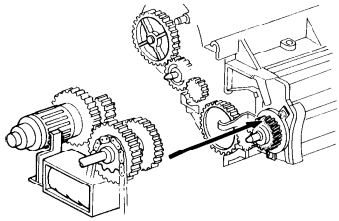
ITEM	EM	60K	120K	180K	240K	NOTES
22. Cleaning brush			R		R	Dust with setting powder
23. Cleaning unit		C	C	C	C	
24. Pick-off pawls	C	C	C	C	C	Replace if necessary
25. Used toner bottie	C	C	C	C	C	Empty of used toner
DEVELOPMENT UNIT						
26. Developer		R	R	R	R	if necessary
27. Upper brush seal		C	C	C	C	
28. Side seals		C	C	C	C	
29. Development unit guide		C	C	C	C	
30. Toner supply clutch			L		L	Mobil Temp 78 Refer to NOTE 1.
31. Development roller gear		L	L	L	L	G-40M Refer to NOTE 1.
FUSING UNIT						
32. Hot roller		C	R	C	R	
33. Pressure roller		C	R	C	R	if necessary
34. Stripper pawis		C	C	C	C	Replace if necessary
35. Oil suppiy pad		R	R	R	R	Prime with sillcone oil
36. Oil blade		C	R	C	R	Prime with sillcone oil
37. Fusing entrance and exit guides		C	C	C	C	Suitable solvent
38. Oil sump		C	C	C	C	
OTHERS						
39. Main drive chain			L		L	Spindle oil Refer to NOTE 1
40. Transport belt		C	C	C	C	Alcohol or water
41. Bushings			L		L	Spindle oil
DOCUMENT FEEDER						
42. Belt	C	C	C	C	C	Belt cleaner, replace if necessary
43. Pick-up roller	C	C	C	C	C	Water, replace if necessary
44. Feed roller	C	C	C	C	C	Water, replace if necessary
45. Friction roller	C	C	C	C	C	Water, repiace if necessary
LARGE CAPACITY TRAY						
46. Pick-up roller	C		R		R	Water

NOTE 1:
The location of the parts which should be lubricated at PM, are shown in the following figure:

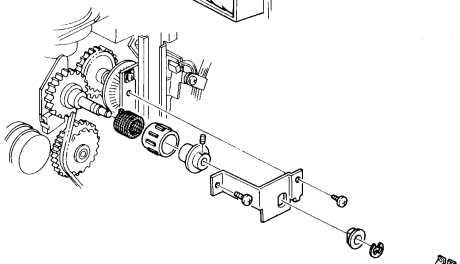


1. Optics Section
   * Use Launa Oil
   1) Scanner Guide Rod (Lubricate at 3k and 6k after installation if there is scanner noise; after that, every 240k).
   2) Scanner Guide Rail (at every 60k).

2. Development Unit
   Lubricate the development roller gear at every 60K using G-40M.

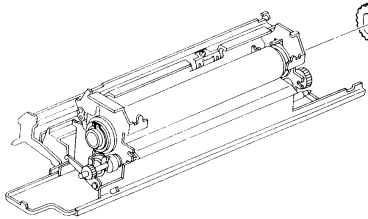


3. Drive Section
   Lubricate the following parts at every 120k.
   1) Toner supply spring clutch
      * Use Mobil Temp 78.
   2) Main Drive Chain
      * Use Spindle Oil.



4. Fusing Unit
   Lubricate the drive gear at every 120k using Mobil Temp 78,

5. Bushings
   Lubricate the bushings at every 1 20k using Spindle Oil.



NOTE 2:
If the LCT is installed, the friction pad wears faster than with cassettes. Check it at 60 K, and if the feed roller contacts the friction pad holder, replace the friction pad.

SERVICE TABLES

TEST POINTS

1. Main Board

Number	Function
TP101	Scanner Free Run (NOTE 1)
TP102, 103, 201	GND
TP104 (CN105)	APS (OW) Voltage
TP105 (CN106)	APS (OL) Voltage
TP202	+ 5V (Vc)
TP203	+ 24V (V_A)
TP204	Factory Use
TP205	+ 12V (Vs)
TP206 (CN209)	ID Sensor Voltage
TP207 (CN212)	ADS Sensor Voltage

2. DF Main Board

Number	Function
TP101	GND
TP102	+ 24V (V_A)
TP103	+ 12V (Power for motor control IC)
TP104	+ 5V (Vc)
TPI05	Belt drive motor encoder pulse

NOTE 1:
To perform scanner free run, short TP1OI and TPI02.

VARIABLE RESISTORS

1. **Main Board**

Number	Function
VR147	**Adjusts** the OW (original width) sensor voltage
VR148	Adjusts the OL (original length) sensor voltage
VR201	Adjusts the ID (image density) sensor voltage
VR202	Adjusts the AD (auto density) sensor voltage

2. Lamp Regulator

Number	Function
VR1	Light adjustment
VR2	Factory Use
VR3	Factory Use

3. **DF Main Board**

Number	Function
VR101	Registration adjustment (0 ± 2.5 mm)
VR103	Belt drive motor speed adjustment (2,500 ± 30 rpm)
VR104	Original entrance sensor output (IC 116-5> + 8V : With paper) (IC 116-5< + 4V : Without paper)
VR105	Original width sensor output (IC 116-7> + 8V : With paper) (IC 116-7< + 4V : Without paper)

DIP SWITCHES

1. Operation Panel

DIP SW 1-1

DIP Switch	Normai	Function
1-1	OFF	Drum conditioning
1-2	OFF	Free run
1-3	OFF	Jam detection disable
1-4	OFF	Sorter instructions
1-5	OFF	Beeper sound disable
1-6	OFF	Oil end check off
1-7	OFF	Manual image density mode priority (ON: manual mode, OFF: ADS mode)
1-8	OFF	SP Mode

2. DF Main Board

DIP SW 101

101-1	101-2	101-3	101-4	Function
ON	OFF	OFF	OFF	Normal mode
ON	OFF	OFF	ON	Free run
ON	ON	OFF	ON	Belt speed adjustment (VR103)
ON	ON	ON	ON	All indicators on

SERVICE PROGRAM MODE (SP MODE) OPERATION

The service program mode is used to check and change electrical data or adjustment values.

1. Data Change Mode

1. Remove the DIP SW cover and turn on DIP SWI -8 on the operation panel. (The Service Call indicator will start blinking.)
2. Enter the desired SP Mode number using the numeral keys. (The entered number is displayed in the copy counter.)
3. Press the Enter key. (The SP Mode number is shifted into the Magnification indicator and the actual data is displayed in the copy counter.)
4. If the data is correct, press the Enter key.
5. Enter the desired data using numeral keys, (The data entered is displayed in the copy counter.)
6. Press the Enter key to place the new data in memory.
7. Turn off DIP SW1 -8. (The Service Call indicator goes off.)

2. Data Check Mode

1. **Perform steps 1 and 2 of the data change mode.**
2. **Press the Enter key. (The data is displayed in the Magnification indicator.)**
3. **Regarding** SP Modes (#5, #9, #10, #50, #54 #55, #56, #57, #60), please refer to the following table.
4. Turn off DIP SW1 -8.

NOTE: When the machine does not receive any data, press the Clear Mode key or turn off the main switch.
The Zoom key can be used to increment or decrement the SP Mode number.

SERVICE PROGRAM MODE TABLE

Mode No.	Function	Data	Factory Setting	Remarks
5 Exposure Lamp OFF Free Run	Free run with exposure lamp. Press the Start key to start free run. Press the C/S key to stop free run.	O: Lamp ON 1: Lamp OFF	--	This mode is also cleared by turnlng off main switch, or, by turning off DIP SW1 -8
9 Exposure Lamp Output	Turns on the exposure lamp and the main motor for about 10 seconds. Enter"1" and then press the Enter key to turn on the exposure lamp. Press the C/S key to turn off the lamp.	--	--	The main motor also rotates to turn the exposure lamp on. When checking the lamp voltage, CN3 on the lamp regulator board is used with this mode.
10 Drum Conditioning	Used to condition a new drum. "99" will appear in the copy counter. Press the Start key to activate.	--	--	This function is the same as Dip SW1 -1. Refer to NOTE 1.
11 All Indicators ON	Turns on all indicators on the operation panel. Turn off the main switch, or, turn off DIP SW1 -8 to stop.	--	--	Refer to NOTE 1.
15 Auto Reset Time	Selects auto reset of 1 or 3 minutes.	0:1 min. 1:3 min. 2: None	0	
16 Count Up/Down	Selects count up or count down.	0: up 1: Down	0	
17 Auto Cassette Shift	Selects Auto-Cassette Shift mode.	o: ON 1: OFF	o	Copier automatically shifts to another cassette holding the same size paper when paper runs out.
20 Feed Station Priority (LCT)	Selects feed station priority.	O: LCT 1: Cassette	o	
21 APS Priority	Selects APS or manual.	O: APS 1: Manual	o	If DF is installed, APS mode is selected when an original is placed on the DF.
22 Feed Station Priority (1st, 2nd, 3rd cassette)	Selects feed station priority.	o: 1st 1: 2nd 2: 3rd	o	Refer to Note 2.

Mode No.	Function	Data	Factory Setting	Remarks
23 DF Original Size	Enables originals of various sizes to be fed from the same stack.	o: OFF 1:ON	o	ADF Mode only.
24 SADF Shut-off Time	Selects the shut-off time for SADF mode.	0:4s 1:60s	o	
28 Auto Sort Mode	Sorl mode is automatically selected when more than 2 originals are set on the DF original table and the entered quantity is greater than 2.	0: Manual 1: Auto	o	Sorter and DF must be installed.
29 Fusing Unit Idle	Selects fusing unit idling mode.	0: No idling 1: idling	0	Copier will idle for 10 seconds. Refer to NOTE 3.
30 Toner Suppiy Mode	Selects toner suppiy mode.	O: Detect B 1: Fixed 2: Detect A	o	
31 Toner Suppiy Amount (Detect Mode A)	Determines how much toner is supplied in detect mode A.	o: 30% 1: 15% 2: 45% 3: 60%	o	
32 Toner Supply Amount (Fixed Mode)	Determines how much toner is supplied in fixed mode.	o: 7% 1:3.5% 2: 10.5% 3: 14%	o	
33 ID Sensor Bias	Sets the bias voltage applied to the bias roller when sensing image density.	0: 470V 1: 440V 2: 500V 3: 530V	o	47oV = Normal 44oV = Lighter 500V = Darker 530V = Darkest
34 Toner Supply Amount (Detect Mode B)	Determines how much toner is supplied in detect mode B.	o: 2% 1: 4%	o	
35 Toner Supply	Changes toner supply interval. a) ID sensor checks every 5 copies. b) Toner end level changes to 0.65V.	0: Standard 1: increase	0	Standard: Every 10 copies, 0.75V.
38 Edge Erase	Sets the width of margin erase.	0: 10mm 1: 5mm 2: 15mm 3: 20mm	o	

Mode No.	Function	Data	Factory Setting	Remarks
39 Center Erase	Sets the width of center erase.	O: 20mm 1: 10mm 2: 15mm 3: 25mm	o	
41 Lead Edge Erase Margin Adjustment	Adjusts the lead edge margin.	0 - 1 5	8 (3,5 mm)	1 mm per step + 10.5 mm to –4.5mm
42 Registration Adjustment	Adjusts registration.	0 - 1 5	8 (Omm)	1 mm per step + 7mm to -8mm
43 Vertical Magnification Adjustment	Adjusts magnification in the paper travel direction.	0 - 1 5	8 (0%)	0.2% per step + 1.4% to –1 .6%
44 Horizontal Magnification Adjustment	Adjusts magnification perpendicular to the direction of paper travel.	0 - 1 5	8 (0%)	0.2% per step + 1.4% to –1 .6%
46 Size Detection Error . Correction	Corrects size detection.	0 - 1 5	8 (Omm)	1 mm per step -7mm to + 8mm
49 Fusing Temperature Change	Changes fusing temperature.	o: Standard 1: Low 2: Higher 3: Highest	0	180 ± 5°C 175 ± 5°C 185 ± 5°C 190 ± 5°C
50 Original Length Detection Check	Displays the length detected by the size detection circuit.	--	--	When pressing the Enter key after entering "50", the original length is detected automatically.
52 Fusing Temperature	Displays the fusing temperature.	--	--	
53 Drum Temperature	Displays the drum temperature.	--	--	
54 Vsg Adjustment	Turns on the ID sensor LED	--	--	The PTL and QL turns on, and the drum rotates for about 30 seconds. The Vsg voltage is also displayed in the magnification indicator.
55 VSG, VSP Voltage	Displays VSG and VSP voltage. This mode is used with drum conditioning mode.	--	--	When the machine is detecting the ID sensor output voltage the Vsp is displayed while holding the Enter key.

Mode No.	Function	Data	Factory Setting	Remarks
56 ADS Input Reference Voltage	Displays ADS voltage. Press the Start key to turn on. Press the C/S key to stop.	-	--	Refer to the ADS adjustment procedure.
57 APS Sensors Voltage Adjustment	Check operation of fiber optics sensors. Standard original, Press the Start key to turn on. Press the C/S key to stop.	--	--	Press the Enter key to display the voltage of the length sensor.
58 Bias Up (Black Development)	Increases the bias voltage	0: Standard 1: 90V up	0	
59 Bias Voltage	Displays the bias voltage	--	--	Press the Start key to indicate the voltage. This does not include the temperature compensation.
60 Toner Supply Recovery	Recover toner volume if the Vsp is above 0.5V. a) Press Start key. b) Toner supply clutch turns on. c) Free run starts. d) Vsp becomes less than 0.5V. e) Free run stops.	--	--	Use this mode if the image density is low. (Black toner only). Refer to NOTE 4 on color toner.
66 Original Check	Copier detects if there is an original left on the exposure glass by a user when using the DF.	0: ON 1 : OFF	o	if the copier detects the orlginal, the jam indicator turns on.
70 Color Toner supply Amount	Selects the color toner suppiy ratio.	0 : 14% 1 : 7% 2: 21% 3:28% 4: 35% 5: 42% 6: 49% 7: 56%	o	
72 Bias OFF	Turns off the bias according to the length of the lead edge erase margin.	0: OFF 1: ON	o	

Mode No.	Function	Data	Factory Setting	Remarks
73 Color Toner Copy Count	Shows the number of color copies made.	0: Red 1: Green 2: Blue	0	Multiply number by 100. Example: 24 = 2400 sheets
75 ID Sensor Bias (Color Toner)	Sets the bias voltage applied to the bias roller when sensing image density.	0: 590V 1: 620V	0	590V = Normal 620V = Darker
76 Sorter Bin Capacity	Sets the stack mode quantity limit.	0: No limit 1: Limit	0	Limit is determined by the paper size. Refer to NOTE 5.
86 PM Counter	Turns on the PM counter.	0: OFF I:ON	0	For PB machines, "O" Is ON "1 " iS OFF.
87 PM Copy Count	Sets the interval of the PM counter.	0: 80K 1: 60K 2: 120K	0	
88 PM Counter Check	Displays the PM counter.	--	--	When the PM count is exceeded, the Service Call and Key Counter indicators blink.
89 PM Counter Reset	Resets the PM counter.	--	--	Use after performing PM.
93 Maximum Copy Quantity	Limits the maximum copy quantity that can be entered.	--	0 (999)	The limit quantity is displayed in the copy counter. (Refer to NOTE 6.)
97 Clear Jam Counter	Clears all jam and service call counters. Enter"1", then press the Enter key to clear the touters.	--	--	DIP SW1 -1 must be on. Clear the following Counters: .SC Counters .Jam Counters
98 Clear All Counters	Clears all counters and returns modes which factory setting is "O" back to "O". Enter"1", then press the Enter key to clear the counters.	--	--	DIP SW1 -1 must be on. Clear the following Counters: .SC Counters • Jam Counters • Copy Counters
99 Clear All Memory	Clears all counters and returns all modes to factory setting. Enter"1", then press the Enter key to clear the memory.	--	--	DIP SW1-1 must be on.

Mode No.	Function	Data	Factory Setting	Remarks
120 Total Service Call	Displays the total number of times that the service call indicator has turned on.	--	--	NOTE 7
121 Service Call - optics	Displays the total number of service tails of the optics section.	--	--	SC21 , SC23, SC24, SC28, SC29, SC2A, SC2B, SC2C, SC2D NOTE 7
122 Service Call - Exposure Lamp	Displays the total number of service calls of, the exposure lamp.	--	--	NOTE 7
123 Service Call - Drive Section	Displays the total number of service calls of the drive section.	--	--	SC31 , SC32, SC41 , SC61 , SC91 NOTE 7
124 Service Call - Fusing Unit	Displays the total number of service cals of the fusing unit.	--	--	SC53, SC54, SC55, SC56 NOTE 7
125 Service Call - Data Transmission	Displays the total number of service calls of the data transmission.	--	--	SC93 NOTE 7
130 Paper Jams	Displays the total number of paper jams.	--	--	NOTE 7
131 Feed Jams	Displays the total number of entrance area paper jams.	--	--	NOTE 7
132 Fusing Jams	Displays the total number of fusing unit jams.	--	--	NOTE 7
138 Sorter Jams	Displays the total number of sorter jams.	--	--	NOTE 7
139 DF Jams	Displays the total number of DF jams.	--	--	NOTE 7

NOTE 1:

For sales demonstrations and/or installation, you can access the SP mode by the following procedure. However, this can only be used for SP Mode #1 O and #11 (without using DIP SW1 -8).

1. **Press the Clear Mode key.**
2. **Press the C/S key, then press the Enter key.**
3. Enter"1 O" or"1 1" using the numeral keys.
4. Press the Enter key. To clear this mode, press the Clear Mode key.

NOTE 2: SP Mode No.20 and 22

Feed Station Priority

	LCT Not Installed			LCT Installed			
SP Mode 20	X	X	X	0	1	1	1
SP Mode 22	0	1	2	X	0	1	2
First Priority	1st	2nd	3rd	2nd	1st	2nd	3rd
Second Priority	2nd	3rd	1st	3rd	2nd	3rd	1st
Third Priority	3rd	1st	2nd	1st	3rd	1st	2nd

- If no cassettes are installed, the machine returns to the first priority setting.
- The "X" mark means "don't care".
- If a cassette is not installed or the cassette is empty, the machine selects the next priority.

NOTE 3: SP Mode No.29

The idling mode may be necessary if the copier has been installed in an environment with low temperature conditions. The idling mode will warm up the fusing rollers enough to ensure fusing at the initial copy run.

Idling Mode: The copier will idle for 10 seconds when the Start key is pressed for the first time after the main switch is turned on.

NOTE: Idling will not be performed if the machine's temperature is more than 150°C when the main switch is turned on.

NOTE 4: SP Mode No.60

For the color toner supply recovery, the following procedure is required:

1. Turn off the main switch and turn on DIP switch 1-2.
2. Turn on the main switch, then press the Start key.
3. While pressing the enter key and the "O" key, the toner supply clutch turns on.
4. Press the Clear/Stop key and turn off the main switch, then turn off DIP switch 1-2.

NOTE 5: SP Mode No.76

Paper Size	Limit Capacity
A3/DLT	10 sheets
A4/LT	30 sheets
A5/HLT	30 sheets

NOTE 6: SP Mode No.93

To change the limit quantity, perform the following:

1. Turn DIP SW1-8 on.
2. Enter "93" using the numeral keys.
3. Press the Enter key.
4. Enter the desired number using the numeral keys.
5. Press the Enter key.

NOTE 7:

The first 3 digits are shown in the magnification indicator.
Press the point (" . ") key to display the second 3 digits.

SERVICE REMARKS

1. Handling the Drum

1. Never touch the drum surface with bare hands.
2. Store the drum in a cool dry place.
3. Always wear gloves when cleaning the drum.
4. Only prime the drum with setting powder when installing a new drum, cleaning blade, and cleaning brush.
5. Never expose the drum to light for a long time.
6. Drum conditioning is necessary when a new drum is installed. In addition, it is useful at the following times:

   . When image density is reduced due to over-exposure of the drum.
   . After cleaning the drum.
   . When the drum is lightly scratched.

7. Always keep the drum in the protective sleeve when inserting or pulling the drum out of the copier.
8. Before inserting or pulling out the drum, the cleaning unit should be pulled slightly out to avoid drum damage by the pick-off pawls.
9. Return used drums to the distributor according to standard procedure.

2. Charge Corona

1. Clean the corona wires with a dry cloth or by sliding the corona unit in and out. Do not use emery paper or any solvent for wire cleaning.
2. Do not touch the corona wires with oily hands. Oil stains may cause white bands on copies.
3. Make sure that the corona wires are correctly positioned between the cleaner pads and there are no threads on the casing.
4. When adjusting the drum current, always make sure that the axis of the drum shoe is aligned with the corona wire.
5. The corona wire height should be adjusted only when:

   a) The front end block is replaced.
   b) The drum charge current is uneven.

3. Optics

1. Do not adjust the following parts:

   a. Scanner Guide Plate
   b. Fourth Mirror Angle Adjusting Screw
   c. Lens Home Position Sensor
   d. Lens unit rails

2. The lens home position sensor does not have a convenient adjusting procedure. When replacing the sensor, mark the position of the sensor bracket before removing it, and adjust the fine position of the sensor by checking the copy image (horizontal magnification and focus).

3. Do not bend or damage the lens support plate or the mylar strip.

4. Launa oil or an equivalent oil should be used to lubricate or clean the following:

   . Scanner Guide Rod (Cleaning)
   . Scanner Guide Rod Pads (Lubrication)
   • Scanner Guide Plate (Lubrication/Cleaning)

Do not use any other kind of oil.

5. Clean the exposure glass with glass cleaner and a dry cloth to reduce static electricity on the glass.

6. Clean the mirrors with water or a silicone cloth only.

7. Do not touch the following parts with bare hands:

   . Reflectors
   . Exposure Lamp
   . Mirrors and Lens

8. Do not bend or crease the ribbon cable of the exposure lamp and the fiber optic cable.

9. When adjusting the light intensity, make ten copies before proceeding to check the copy image if the main switch has just been turned on. This is to eliminate the effect of rest time compensation.

10. After adjusting the light intensity, check and adjust the Auto ID and APS sensors.

4. Development

1. Be careful not to nick or scratch the development roller sleeve.
2. Place a sheet of paper under the development unit when it is out of the copier.
3. Be careful not to bend the bias terminal.
4. Clean the drive gears and end magnets after removing used developer.
5. Clean the development unit guide plate before reinstalling the unit.

5. Toner Supply

1. The image density sensor and the pre-transfer lamp unit should be cleaned with a blower brush.
2. Do not touch the sensor pattern with bare hands.
3. Image density sensor adjustment is required when:

   . The ID sensor/PTL board is replaced.
   . The main board is replaced.
   . The drum has been replaced and Vsg is out of specification.
   . Problems with toner supply have occurred and ID sensor check shows Vsg to be out of specification.

4. Grease the toner supply clutch with Mobil Temp 78 periodically to avoid noise and faulty operation.

6. Transfer and Separation

1. The corona wires should be cleaned with a dry cloth.
2. While the drum stay is out and the drum is installed on the drum guide, do not lift up the corona unit. (The corona casing will knock against the drum.)

7. Cleaning

1. When servicing, be careful not to damage the edge of the cleaning blade.
2. Do not touch the cleaning brush with your bare hands.
3. Before pulling out the cleaning unit, place a sheet of paper under it to catch falling toner.

4. Be careful not to damage the drum with the pick-off pawls when pulling out or inserting the cleaning unit.

5. When installing the toner collection bottle cover, be sure that the hooks of the transport plate are positioned underneath the bottle cover.

6. After replacing the cleaning solenoid, adjust the position of the cleaning solenoid.

8. Fusing

1. When removing the fusing unit, keep it in an upright position so that the silicone oil does not spill.
2. After replacing the oil blade and oil supply pad, prime them with silicone oil.
3. Be careful not to damage the edge of the hot roller strippers or their tension springs.
4. Do not touch the fusing lamp with bare hands.
5. Be sure that the fusing lamp is not in contact with the inner surface of the hot roller.
6. Be sure that the oil end sensor contacts the bottom of the oil tank.
7. When paper creasing occurs, adjust the position of the entrance guide plate or the fusing pressure.

9. Paper Feed

1. When replacing the friction pad, make sure that the friction pad is below the surface of the front lip of the pad holder.
2. When reinstalling the support bracket after cleaning the registration sensor, make sure that the bracket is properly engaged with the groove of the registration clutch stopper.
3. When replacing the friction pad, adjust the gap between the feed roller and the friction pad.
4. Do not touch the feed roller and the friction pad with oily hands.

10. Document Feeder

1. Do not bend the DF interface harness sharply, to avoid damaging the fiber optics cables.

2. When servicing the document feeder, make sure that the main switch of the copier is off.

3. When installing or reinstalling the document feeder, make sure that the document feeder is in the open position.

11. Sorter

1. The sorter has two types of bins; one type is used for odd numbered bins and the others used for even numbers. Be careful not to mix them up,

2. If bin operation is not smooth, lubricate the slot liners and transfer wheels using grease 501 or an equivalent type.

12. Large Capacity Tray

1. Unplug the power supply cord of the LCT before servicing it.

2. Before placing the large capacity tray in the cassette holders, make sure that the paper position feeler is set properly.

13. Others

1. When the main board is removed from the PCB plate, do not put it on a conductive surface. (This is to avoid discharging the battery for the user program memory.)

2. When installing a new main board, remove the RAM from the old main board. Reinstall the old RAM on the new main board, if the old RAM is not faulty.

3. When taking out the drum, be sure that the PTL board has already been removed. if the PTL board is not removed, the drum may be damaged by the PTL board.

4. When installing the PTL board, be sure that the drum stay has been already installed. If the drum stay is not installed, the drum may be damaged by the PTL board.

5. When replacing a sensor, do not overtighten the screw. If the screw is overtightened, the sensor may be damaged.

SPECIAL TOOLS AND LUBRICANTS

Part Number	Description	Q'ty
A0079504	Doctor Gap Gauge	1
52059601	Switching Board	1
52059101	Gap Gauge - 0.1 mm	1
52069600	Sensor Checker	1
52039501	Grease (Shinetsu Silicone G-501)	1
54429101	Setting Powder	1
54429106	Drum Shoe	1
54479104	Shoe Adapter	1
54209504	Digital Thermometer	1
54209505	Digital Thermometer Probe	1
54209507	Digital Multimeter	1
54209550	Silicone Oil	1
54479078	Heat Resistant Grease (MT-78)	1
54209516	Test Chart OS-A3 (10pcs/set)	
54209502	Test Chart OS-A3 (100pcs/set)	
54429103	Launa Oil	1
A0089502	G-40M	1

SECTION 5

REPLACEMENT AND ADJUSTMENT

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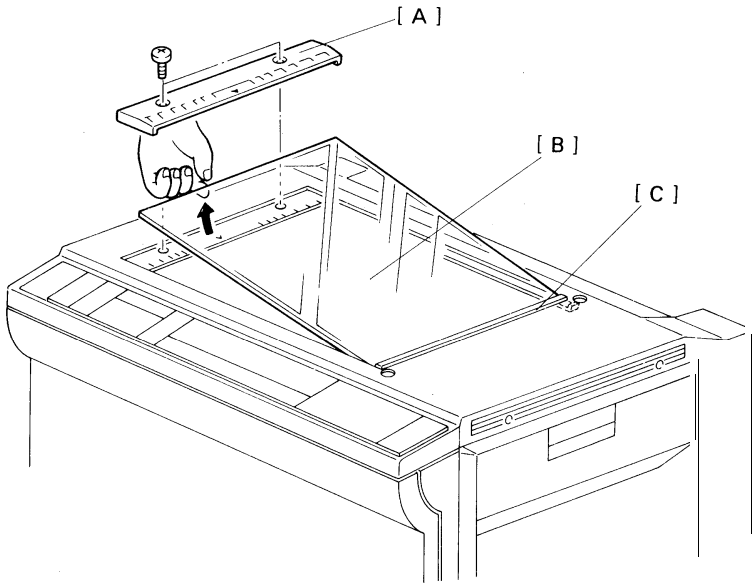
OPTICS

1. Exposure Glass Removal

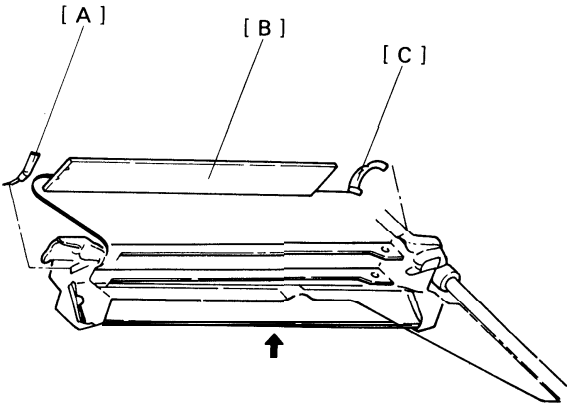


1. Take off the left scale [A] (2 short screws).
2. Grasp the left edge of the exposure glass [B] and lift it up slightly. Slide the other edge out from under the right glass holder [C]. Remove the exposure glass.

NOTE: When reinstalling the exposure glass:

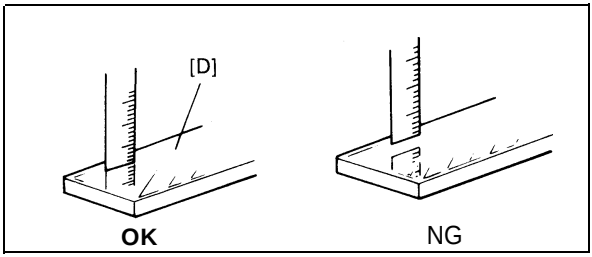
- Make sure that the left edge of the glass is flush with the two tabs to the left of the scale plate.
- Make sure that the right glass holder firmly secures the exposure glass.

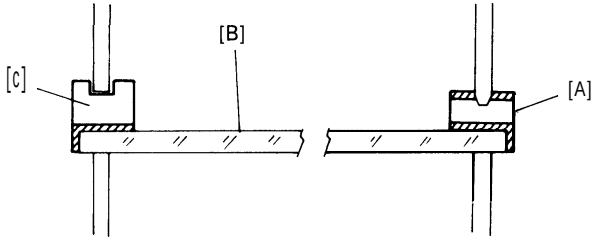
2. 2nd Mirror Removal



NOTE: This procedure is usually performed in order to make cleaning of the 3rd mirror easier.

1. Turn off the main switch.
2. Remove the exposure glass, (See Exposure Glass Removal.)
3. Move the 1st scanner 2/3 to the right by pushing it at the rear.
4. Remove the front spring plate [A] by pressing the top of the spring and moving the plate towards the front of the machine.
5. Carefully pull the 2nd mirror [B] towards the front of the machine to remove the rear spring plate [C].
6. Lift the mirror out of the machine rear side first.
7. Clean the mirrors with silicone cloth or water, and then dry.



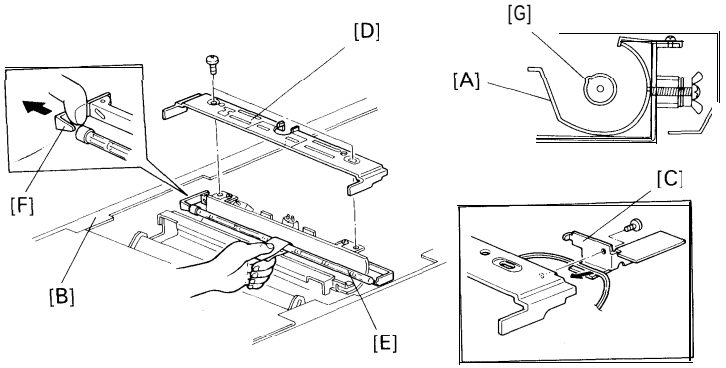


- To Reinstall

8. Place the rear spring plate [A] inplace and hold it with your finger.
9. Insert the 2nd mirror [B] into the front side plate cutout.
10. Insert the rear side of the mirror into the rear spring plate.
11. Locate the bottom of the front spring plate [C] and rotate the top of the spring into position.

NOTE: Make sure that you install the mirrors with the reflecting surface [D] facing the lens as shown.

3. Exposure Lamp Replacement



Do not touch the reflector [A] **or the new exposure lamp with your bare hands. Use a strip of paper as shown. (Finger oil marks on the lamp or reflectors will be affected by the heat and will result in discoloration.)**

1. Turn off the main switch.
2. Remove the exposure glass. (See Exposure Glass Removal.)
3. Move the first scanner to the position where the rear frame [B] is cut out.
4. Remove the front terminal cover [C] (1 screw) and the reflector cover [D] (2 screws) after unhooking the fiber optics cables.
5. Wrap a strip of paper around the exposure lamp [E] as shown.
6. Press the release lever [F] on the rear lamp terminal as shown and take out the lamp.
7. Install a new lamp using a strip of paper. (Set the front terminal first.)

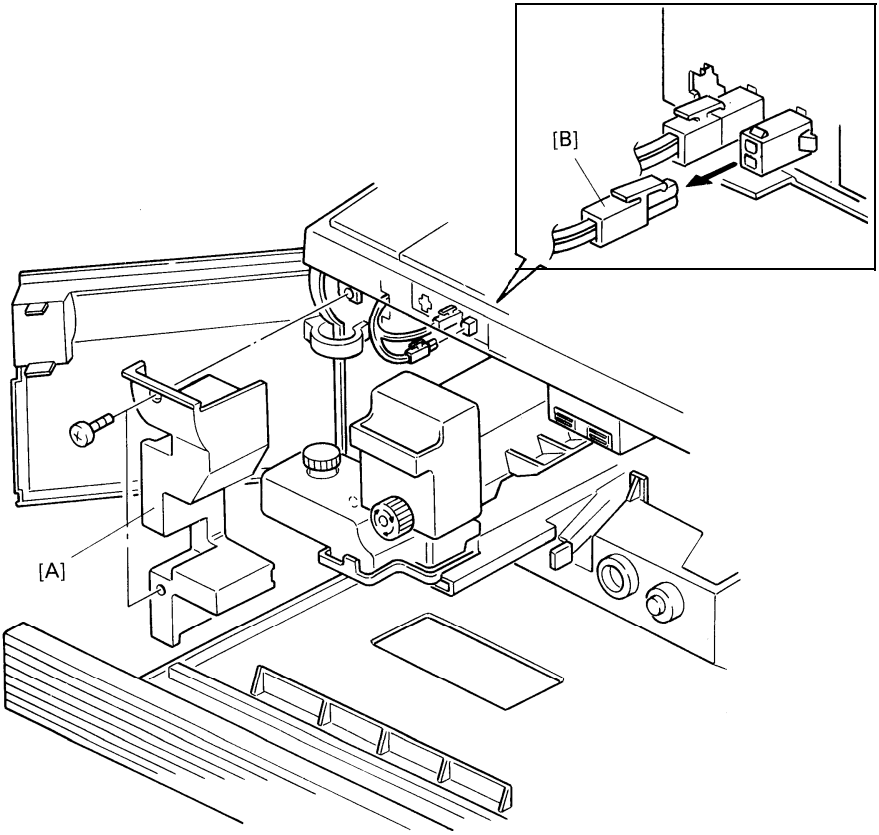
NOTE: The blister [G] on the lamp must point towards the opening of the reflector as shown.

8. Reassemble the 1st scanner.

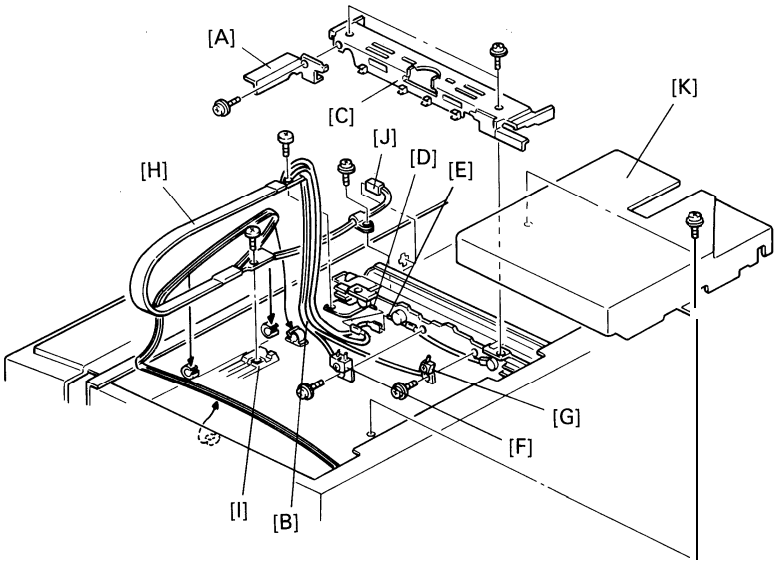
NOTE: When reinstalling the front terminal cover, be careful not to damage the fiber optics cables.

9. Check the exposure lamp position, the light intensity and auto ID sensor. (See Exposure Lamp Position, Lignt Intensity, Auto ID Sensor, and OW/OL sensors Adjustments.)

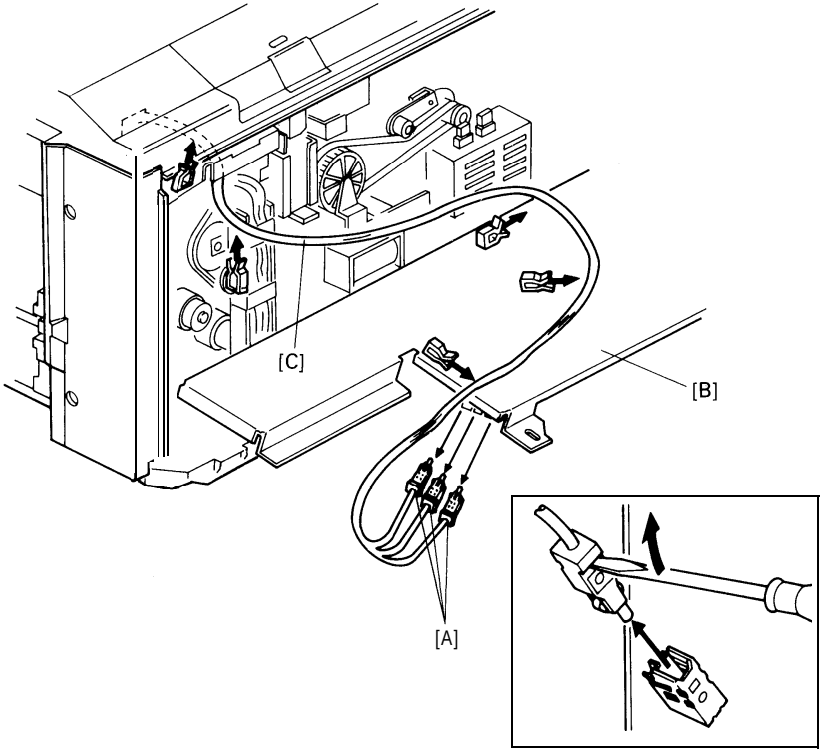
4. **Fiber Optic Cable Replacement**



1. Turn off the main switch.
2. Remove the platen cover, left scale (2 screws), and exposure glass.
3. Open the front doors and pull out the cassette tray.
4. Pull the fusing unit out half-way, then remove the left inner cover [A] (2 screws).
5. Disconnect the exposure lamp connector [B] (2P ; White), then reinstall the left inner cover.

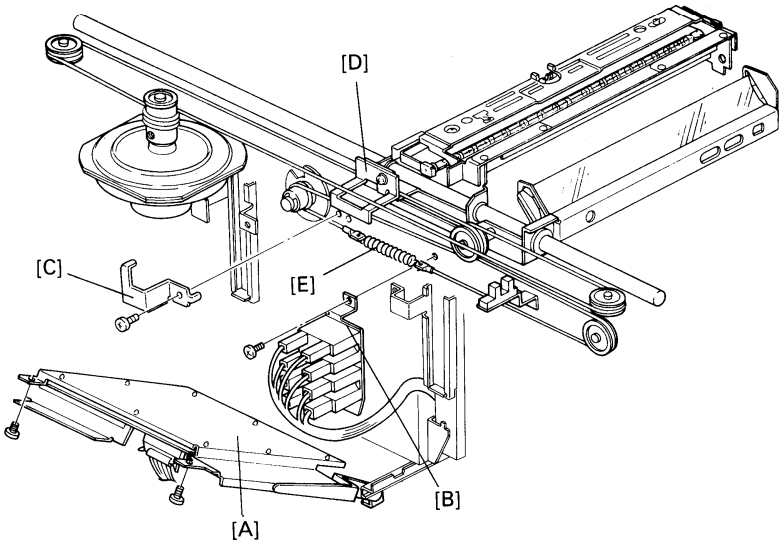


6. Remove the rear cover (2 screws) and the upper cover (11 screws).
7. Remove the front terminal cover [A] (1 screw)..
8. Unhook the fiber optic cable [B] from the reflector cover [C] and remove the reflector cover (2 screws).
9. Disconnect the leads from the exposure lamp terminal and the thermostat terminal [D and E].
10. Remove the auto lD/OL sensor [F] and the OW sensor [G] (1 screw each).
11. Remove the scanner harness [H] from the harness hold-down block **[1] (1** screw).
12. Slide the scanner to the right and disconnect the exposure lamp connector [J].
13. Remove the fiber optic cable from the clamps inside the optics cavity.
14. Slide the scanner to the left and remove the lens housing cover [K] (2 screws).

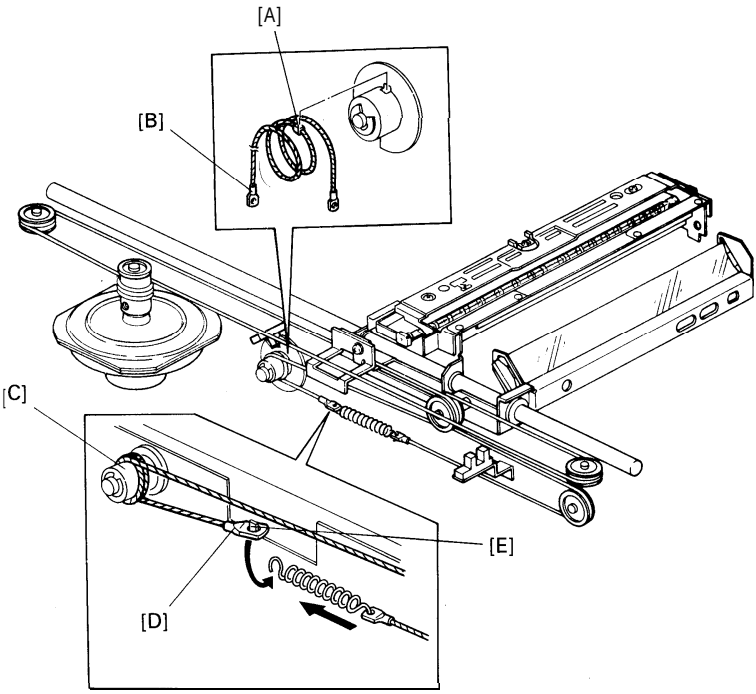


15. Disconnect the auto ID, OL, OW sensor cables [A] from the main PCB (CN215, CN103, and CN104).
16. Lower the PCB plate [B] (2 screws).
17. As shown in the illustration, remove the fiber optic cable [C] from the clamps and pull the cable through the opening into the optics cavity.
18. Replace the fiber optic cable.

5. Scanner Drive Wire Replacement

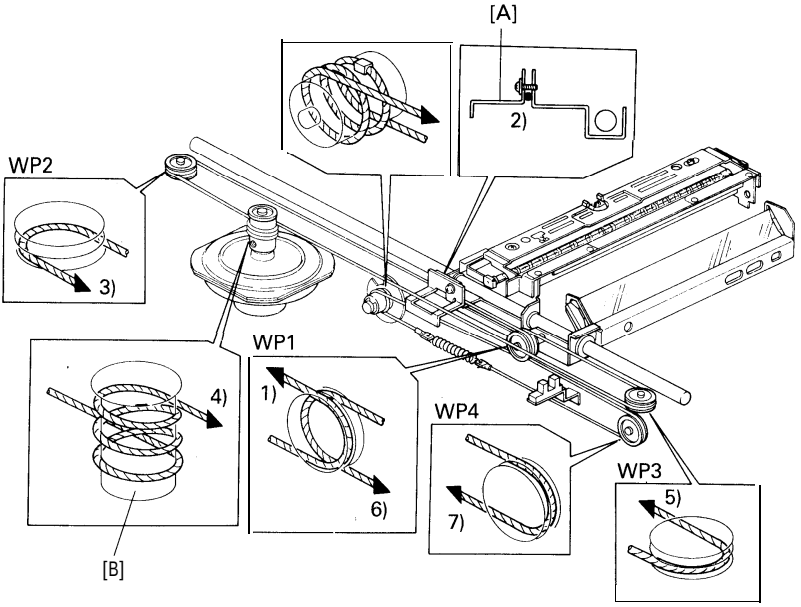


1. Turn off the main switch.
2. Remove the platen cover and the upper cover (11 screws).
3. Remove the left scale (2 short screws) and the exposure glass.
4. Remove the rear cover and lower the PCB plate [A] (2 screws each).
5. Remove the power relay bracket [B] and the scanner wire holder [C] (1 screw each).
6. Loosen the wire clamp screw [D].
7. Unhook the tension spring [E] and remove the scanner drive wire.



8. Position the bead [A] of the new wire [B] on the groove of the 2nd scanner drive pulley [C] and wrap the wire around the pulley with two and a half turns as shown.

9. Hook the short end [D] of the wire to the stopper [E] as shown.



10. Run the scanner drive wire over the pulleys in the following order:

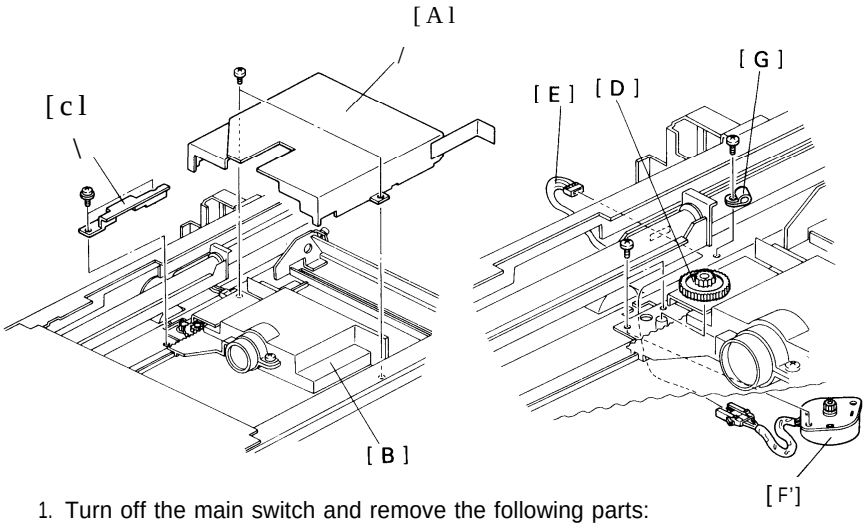
1) Long end should be in the outer track (WPI)
2) Lower side (wire clamp [A])
3) Lower track (WP2)
4) Three turns from lower to upper (Scanner Drive Pulley [B]).
5) Lower track (WP3).
6) Inner track (WP1).
7) Track (WP4).

11. Pull the ends of the wire together and join them with the tension spring. (See the preceding page.)

12. Rotate the scanner drive pulley and make sure that the scanner drive wire moves smoothly and that there is no overlapping around the scanner drive pulley.

NOTE: Step 12 is important! If there is any overlapping of the scanner drive wire, then the trailing edge of A3 (11" x 17") copies might not be scanned.

6. Lens Drive Motor Replacement

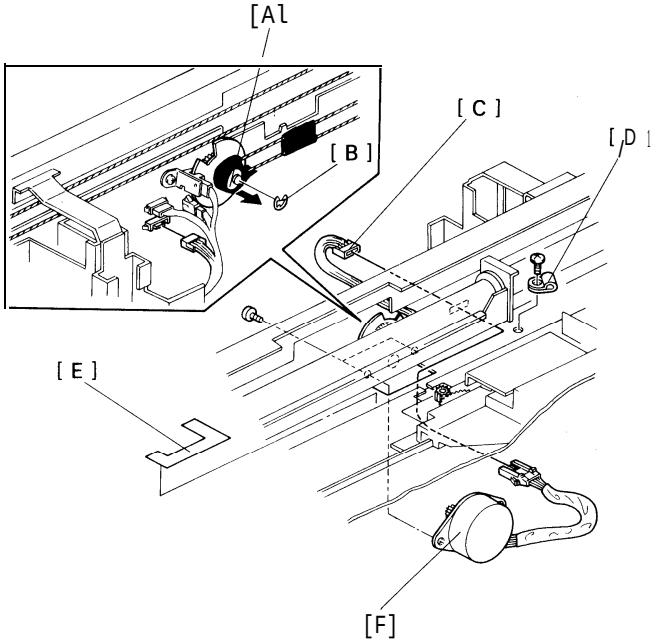


1. Turn off the main switch and remove the following parts:

   1) Development unit
   2) Charge corona unit (1 screw)
   3) Toner collection bottle
   4) Drum stay (1 screw and knob)
   5) Cleaning unit
   6) Drum flange and drum - should be covered with a shielding sleeve.

2. Remove the platen cover and the mounting studs.
3. Remove the left scale, the exposure glass, and the upper cover.
4. Move the scanner to the home position.
5. Remove the lens cover [A] (2 screws).
6. Move the lens unit [B] to a reduction position.
7. Remove the lens drive gear cover [C] (2 screws) and the idle gear [D].
8. Remove the rear cover and lower the PCB plate (2 screws each).
9. Disconnect the connector [E] (6p; black) of the lens drive motor [F] and remove the nylon clamp [G] (1 screw).
10. Replace the lens drive motor [F] from the front (2 screws).

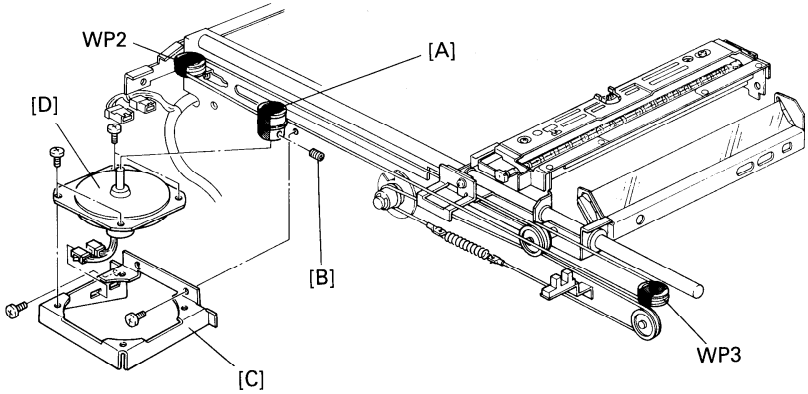
7. 2nd Scanner Drive Motor Replacement



Perform steps 1 through 6 of "Lens Drive Motor Replacement."

1. Tape the 2nd scanner drive pulley [A] and the scanner drive wire as shown to prevent the scanner wire from coming off.
2. Remove the E-ring [B] from the 2nd scanner drive shaft and move the pulley slightly in the direction of the arrow.
3. Disconnect the 2nd scanner drive motor connector [C] (6p; white) and the nylon clamp [D] (1 screw).
4. Remove the mylar [E].
5. Replace the second scanner drive motor [F] from the front (2 screws).

8. Scanner Drive Motor Replacement



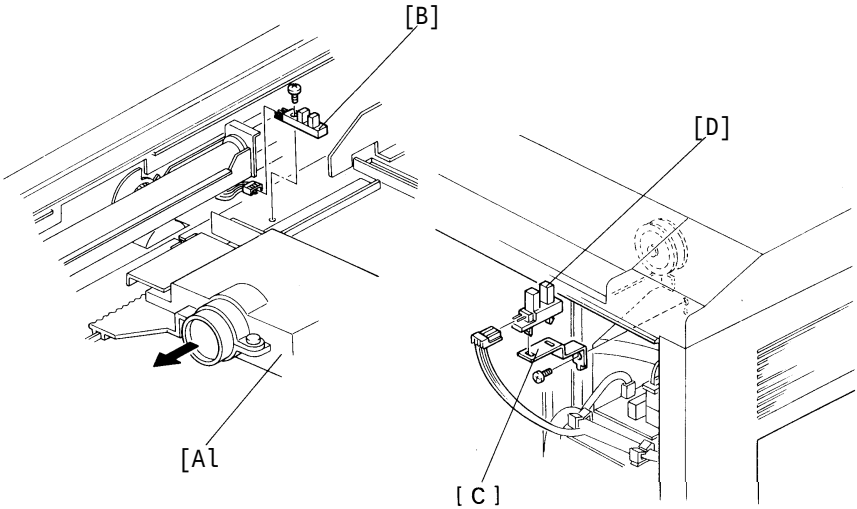
1. Turn off the main switch.
2. Remove the platen cover and the mounting studs.
3. Remove the left scale (2 short screws), the exposure glass, and the upper cover (9 screws).
4. Remove the rear cover (2 screws).
5. Tape the scanner drive pulley [A] and pulleys WP2 and WP3 as shown to prevent the scanner wire from coming off.
6. Loosen the scanner drive pulley (1 Allen screw [B]).
7. Remove the scanner drive pulley from the motor shaft.
8. Remove the motor bracket [C] (3 screws).
9. Remove the scanner drive motor [D] (4 screws and 2 connectors).
10. Install the new scanner drive motor and reassemble.

NOTE: a) When installing the scanner drive motor, make sure the 3p connector is positioned on the left-hand side.

b) When installing the scanner drive pulley on the motor shaft, the scanner drive pulley should be flush with the end of the motor shaft.

11. Examine the scanner drive wire for proper installation.

9. Lens Home Position Sensor Replacement



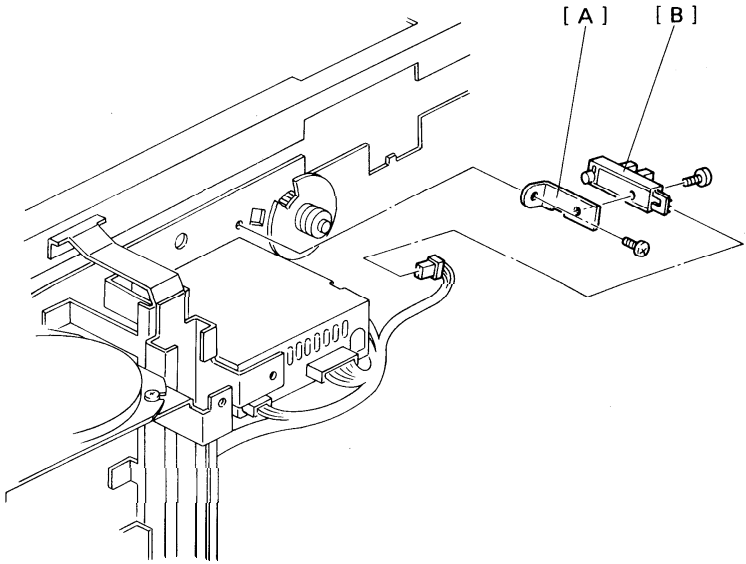
1. Turn off the main switch.
2. Remove the left scale and the exposure glass. (See Exposure Glass Removal.)
3. Remove the lens cover (2 screws) and move the lens unit [A] in the direction of the arrow.
4. Replace the lens home position sensor [B] (1 screw and 1 connector).

NOTE: Do not overtighten the screw when securing the new sensor.

10 Scanner Home Position Sensor Replacement

1. Turn off the main switch.
2. Remove the rear cover (2 screws).
3. Remove the sensor bracket [C] (1 screw).
4. Replace the scanner home position sensor [D] (1 connector).

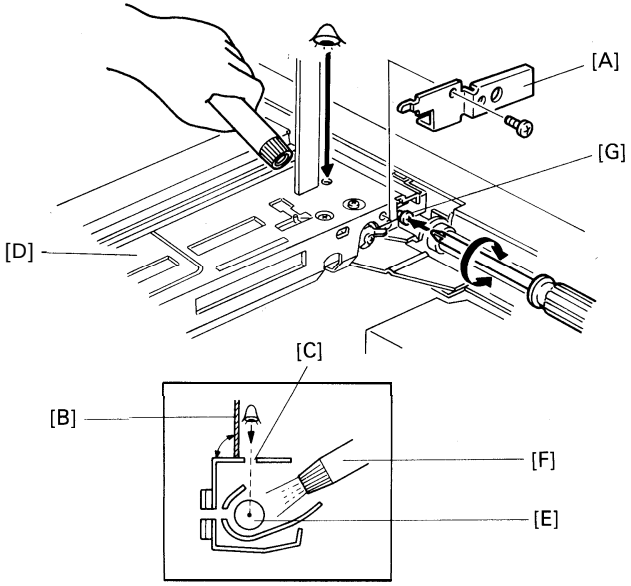
11. 2nd Scanner Home Position Sensor Replacement



1. Turn off the main switch.
2. Remove the rear cover (2 screws).
3. Remove the sensor bracket [A] (1 screw).
4. Replace the 2nd scanner home position sensor [B] (1 screw and 1 connector).

NOTE: Do not overtighten the screw when securing the new sensor.

12. Exposure Lamp Position Adjustment



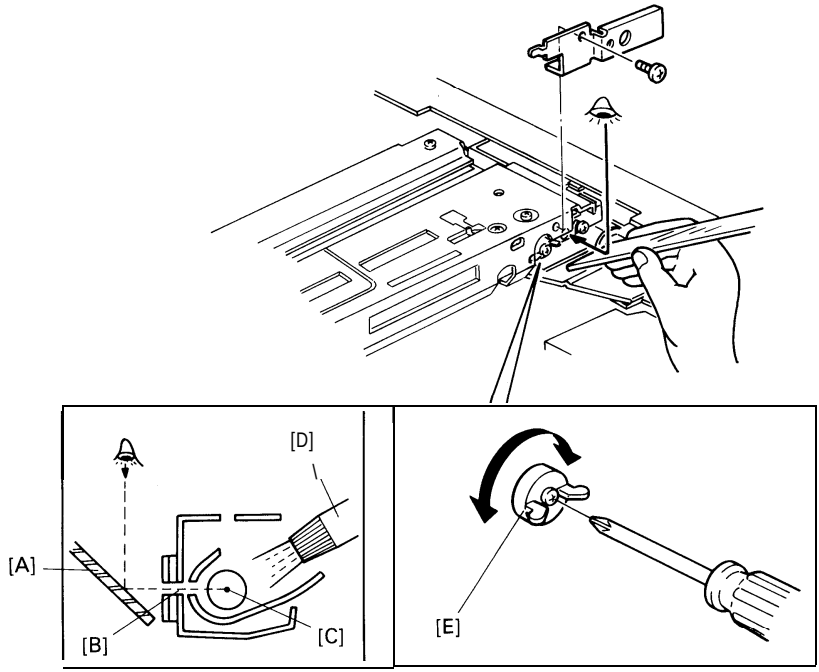
1. Turn off the main switch.
2. Remove the exposure glass. (See Exposure Glass Removal.)
3. Move the first scanner to the position where the rear frame is cut out.
4. Remove the front and rear terminal covers [A] (1 screw each).

- Horizontal Adjustment -

5. Position a scale [B] near the rear sight hole [C] of the reflector cover [D] to form a right angle for viewing alignment as shown.
6. View the lamp filament [E] through the sight hole in parallel with the scale. The filament should be directly beneath the sight hole.

NOTE: If the filament cannot be seen easily, use a pen light [F] to illuminate the exposure lamp.

7. To correct the position of the filament turn the adjusting screw [G].
8. Repeat the above steps from 5 to 7 with the front sight hole.



- Vertical Adjustment -

9. Position a mirror [A] beside the rear sight hole [B] at a 45° angle as shown.

NOTE: If you do not have a mirror, remove and use the 2nd mirror.

10. View the lamp filament [C] through the sight hole reflected on the mirror. The filament should be level with the sight hole.

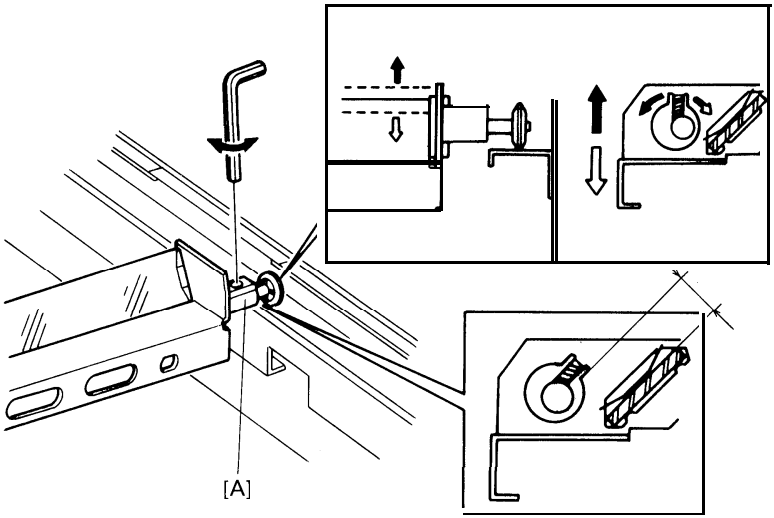
NOTE: If the filament cannot be seen easily, use a pen light [D] to illuminate the exposure lamp.

11. To correct the position of the filament, turn the adjusting knob [E].

12. Repeat the above steps from 9 to 11 with the front sight hole.

13. 2nd Scanner Height Adjustment

ADJUSTMENT STANDARD: Parallel between the eccentric cam and the 2nd mirror as shown in the figure.



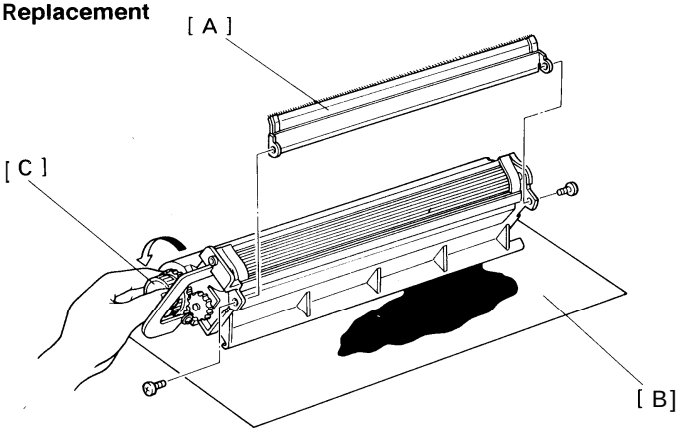
NOTE: The 2nd Scanner height must be adjusted when distorted images appear on a copy.
After adjusting the scanner height, check the copy image.

1. Turn off the main switch.
2. Remove the exposure glass. (See Exposure Glass Removal.)
3. Loosen the Allen screw on the eccentric cam [A] with an Allen wrench.
4. Adjust the height by turning the eccentric cam.

   Clockwise: The height is decreased.
   Counterclockwise: The height is increased.

DEVELOPMENT AND TONER SUPPLY

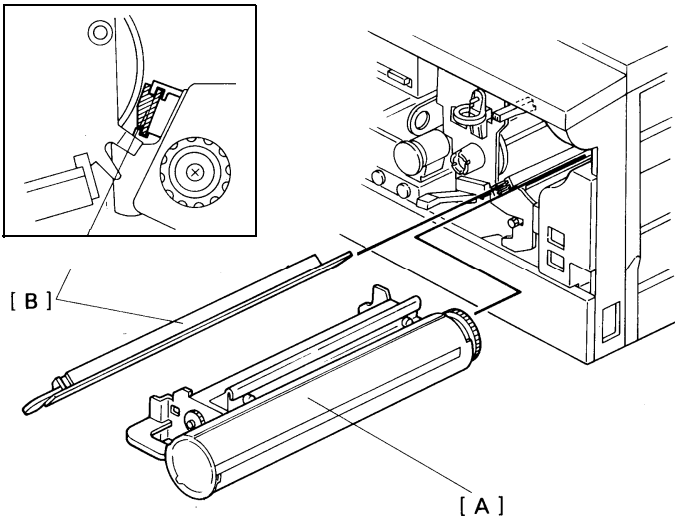
1. **Developer Replacement**



- Be careful not to bend the bias terminal.
- Be careful not to damage the upper brush seal.
- After removing used developer, clean the drive gears and end magnets.

1. Take out the development unit and remove the toner tank (2 screws).
2. Remove the development brush cover [A] (2 screws) and clean it.
3. Set the development unit on a large sheet of paper [B] with the unit's inlet facing downward.
4. Turn the paddle roller knob [C] counterclockwise. The developer will fall out onto the paper.
5. Hold the unit at an angle and dump out the developer that has collected at the ends of the development unit.
6. Repeat the above steps until you have removed all of the developer.
7. Clean the development end magnets.
8. Turn the unit right-side up and pour in one bottle of developer (1 kg).
9. Put the used developer into the empty bottle or disposal bag and dispose it according to the local regulations.
10. Reassemble the toner tank (2 screws) and replace the development unit.

2. Image Density Sensor/PTL Removal

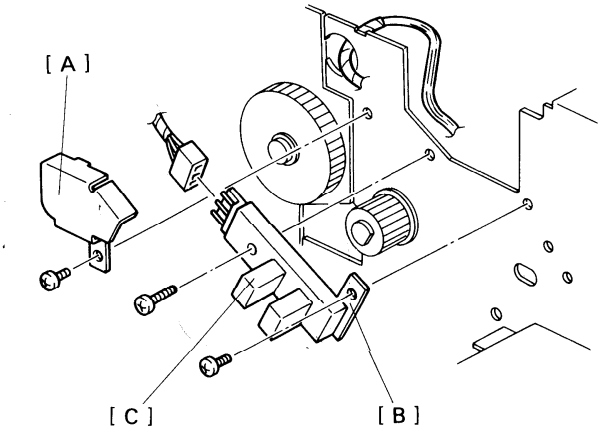


1. Open the front door.
2. Remove the development unit [A].
3. Slide out the image density sensor/PTL [B].
4. Clean and reinstall the ID sensor/PTL.

NOTE: When sliding in the ID sensor/PTL board, make sure that the board is properly located on the rails as shown.

5. Reinstall the development unit.

3. Color Toner End Sensor Replacement



1. Turn off the main switch and remove the following parts:

   - Development unit
   - Charge corona unit (1 screw)
   - Drum stay (1 screw and 1 knob)
   - Cleaning unit
   - Drum flange and drum - should be covered with a shielding sleeve
   - Toner shield glass.

2. Remove the connector cover [A] (1 screw).

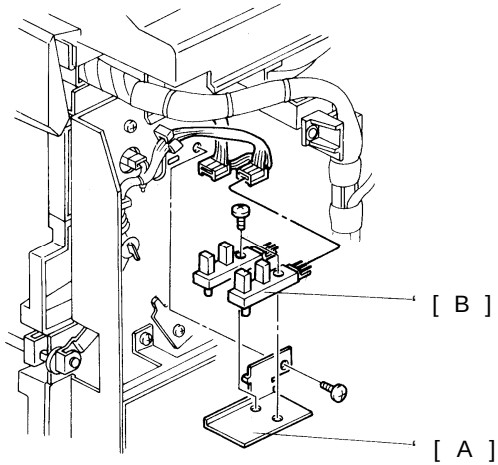
3. Remove the sensor bracket [B] (1 screw).

4. Remove the color toner end sensor [C] (1 screw).

5. Reinstall the above parts.

NOTE: Do not overtighten the screw when securing the new sensor.

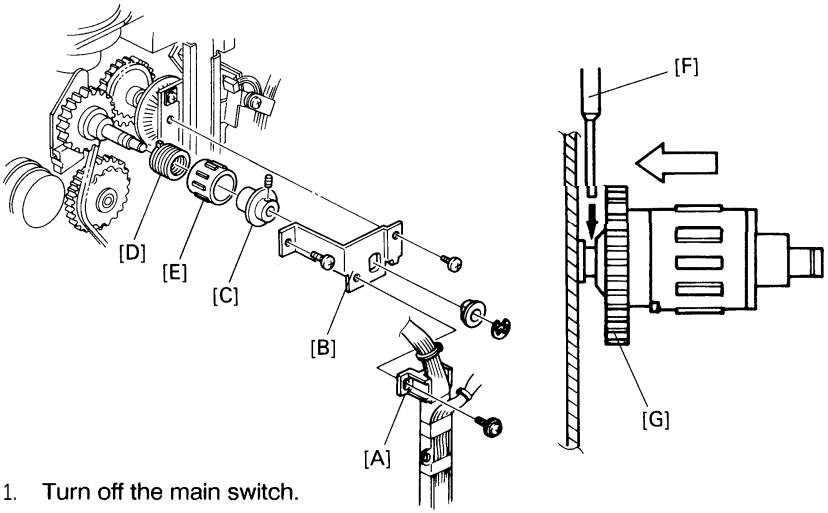
4. Color Toner Sensor Replacement



1. Remove the rear cover (2 screws).
2. Remove the color toner sensor bracket [A] (1 screw).
3. Replace the color toner sensors [B] (1 screw and 1 connector each).
4. Reassemble.

NOTE: Do not overtighten the screw when securing the new sensor.

5. **Toner Supply Clutch Lubrication**



1. Turn off the main switch.
2. Remove the rear cover (2 screws).
3. Remove the screw securing the dc harness guide [A] to the toner supply clutch support bracket [B].
4. Remove the toner supply clutch support bracket.
5. Remove the clutch hub [C] (1 Allen screw), the spring [D], and the sleeve [E].

NOTE: When removing the dc harness guide, be careful not to damage the fiber optic cable.

6. Clean the clutch hub, spring, and gear.
7. Apply grease (Mobil Temp 78) inside the spring.

NOTE: - Make sure that the right-angle projection is inside the notch of the sleeve.

- When securing the Allen screw of the clutch hub, insert a 0.1 mm gap gauge [F] between the E-ring and the toner supply roller drive gear [G] as shown in the figure.

6. **Image Density Sensor Check and Adjustment**

NOTE: ID sensor adjustment is required in the following cases:

When the ID sensor/PTL board is replaced.

When the main board is replaced.

When the drum is replaced and Vsg is not within specification.

When a toner supply problem occurs and a check of the ID sensor shows that Vsg is not within specifications.

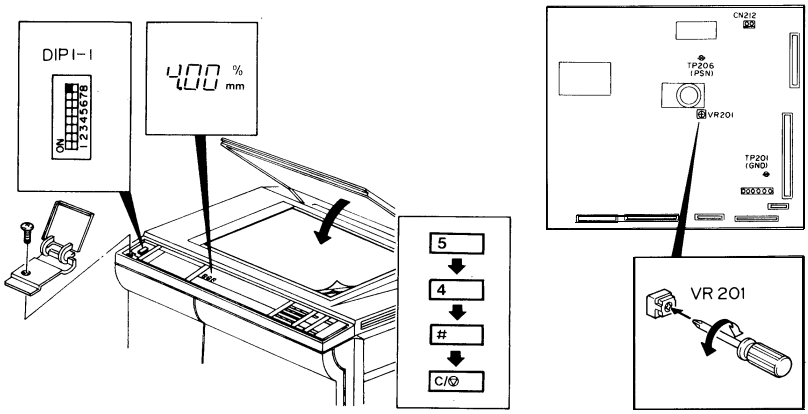
ADJUSTMENT STANDARD: +4 ± 0.2V

1. Clean the following parts:

   - Image density sensor
   - **Optics** (Exposure glass, mirrors, reflectors, lens, and toner shield glass)
   - Charge corona wire with dry cloth
   - Erase lamp unit
   - Quenching lamp.

2. Place 2 or 3 sheets of paper (A3 or 11" x 17") on the exposure glass and lower the platen cover.

3. Confirm that the main switch is off and turn on DIP switch No. 1-8 under the instruction cards on the operation panel.



4. Turn on the main switch and allow the machine to warmup.

5. Enter "54" using the Number keys, then press the Enter key

NOTE: The main motor and the exposure lamp turn on for about 30 seconds when the Enter key is pressed. The scanner starts scanning in Free Run mode and the Vsg voltage reading is displayed on the magnification indicator.

6. If Vsg is incorrect, remove the rear cover (2 screws).

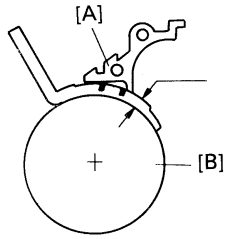
7. While Vsg is displayed, adjust VR201 on the main board to +4 ± 0.2 **volts.**

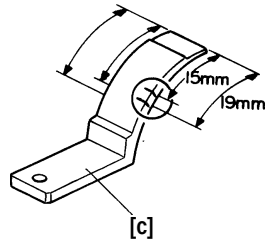
NOTE: VR201 clockwise ⇒ increase voltage
VR201 counterclockwise ⇒ decrease voltage.

8. Press the C/S key to stop the copier.

9. Turn off the main switch and turn off DIP switch No. 1-8

7. Doctor Gap Adjustment



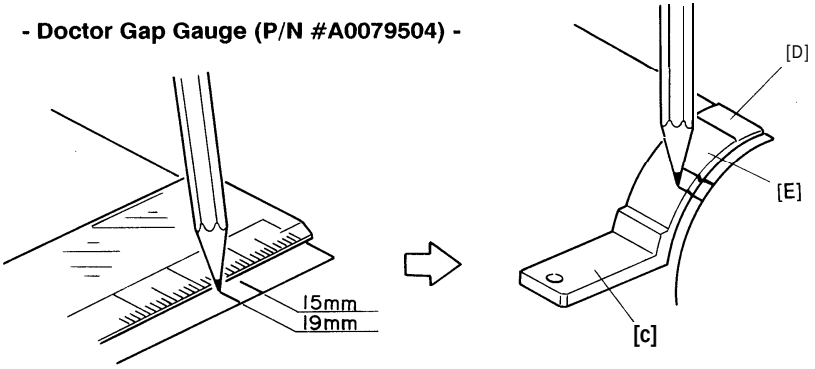


NOTE: - The doctor gap gauge (P/N #AO079504) is used for this adjustment procedure.
Doctor gap adjustment is required whenever the development unit has been disassembled or the doctor plate [A] is replaced.

CAUTION: Make sure that the development roller [B] is clean during the following procedure, otherwise the roller will become scratched, and/or the gap will be adjusted too wide.

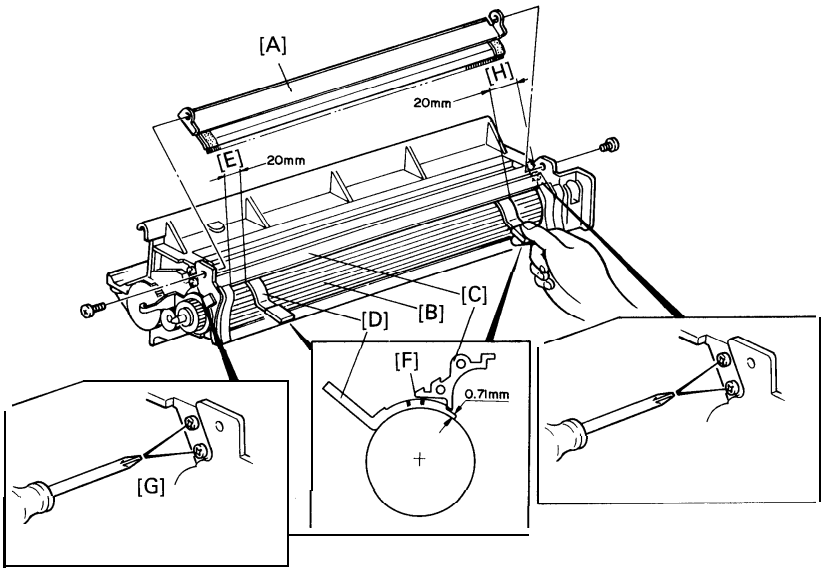
ADJUSTMENT STANDARD: 0.76 ± 0.1 mm (0.03" ± 0.004")

- Doctor Gap Gauge (P/N #A0079504) -



- This Doctor Gap gauge [C] has a "GO" gauge (0.71 mm) [D] and a "NO GO" gauge (0.86mm) [E].

- In order to know how far to insert the gauge, place two marks on the gauge's upper side as shown in the figure.
Put one mark 15mm from the leading edge of the gauge and the other mark 19mm from the leading edge of the gauge.



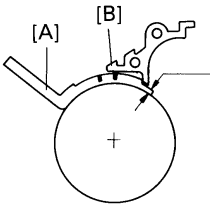
- Adjustment Procedure -

1. **Remove the developer and the entrance brush seal [A] (2 screws).**
2. **Clean all developer from the development roller sleeve [B] with a vacuum cleaner. Turn the roller to make sure that it is free of developer.**
3. **Loosen the doctor plate [C] (4 screws).**
4. **Insert the gauge [D] in the doctor gap 20mm from the rear side [E] of the development roller. The edge of the doctor plate [F] must be between the two marks as shown in the figure.**
5. **Press down the doctor plate, and tighten the rear doctor plate screws [G].**
6. **Repeat the adjustment procedure at the front side [H] of the development unit.**
7. **Check the doctor gap, following the procedure given below.**

- Confirmation Procedure -

1. **Carefully follow the procedure given here to correctly measure the doctor gap.**

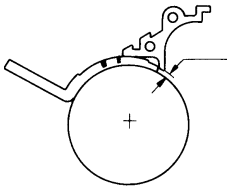
   1) Insert the gauge [A] into the doctor gap 20mm from the front end of the development roller.
   2) Check whether point [B] on the doctor plate is between the two marks on the gauge.
   3) Check the doctor gap at three other points 20mm from the end of the development roller, turning the roller 90° each time.
   4) Repeat steps 1), 2), and 3) for the rear end of the development roller.



OK

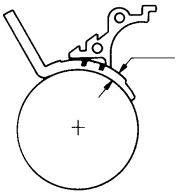
If only one mark is visible, the 0.71 mm gauge has been inserted through the doctor gap. The 0.86 gauge has not passed through the gap. Therefore, the gap at this point is:

$$0.71 \leqq DG \leqq 0.86$$



NOT OK

If both marks are visible, the 0.71 mm gauge has not been inserted in the gap. Therefore, the gap is smaller than 0.71 mm.



NOT OK

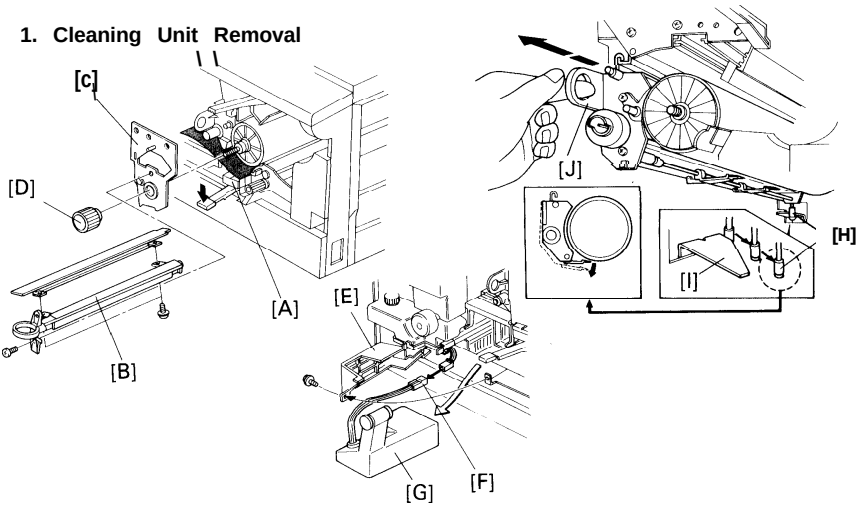
if no mark is visible, the 0.86mm gauge has been inserted in the doctor gap. Therefore, the gap is larger than 0.86mm.

2. **When three points on each side are 0.71- 0.86mm, the gap has been adjusted properly.**

3. **If the gap at two or more points on either side is smaller than 0.71 mm or wider than 0.86mm, readjust the gap.**

CLEANING

1. Cleaning Unit Removal



1. Remove the development unit and the PTL board.

2. Lower the T/S corona unit [A].

3. Remove the charge corona unit [B] (1 screw) and the drum stay [C] (1 knob [D] and 1 screw).

NOTE: The drum stay knob has a reverse thread.

4. Swing the toner collection bottle cover [E] to the left (1 screw).

5. Disconnect the toner collection bottle sensor [F] (1 connector).

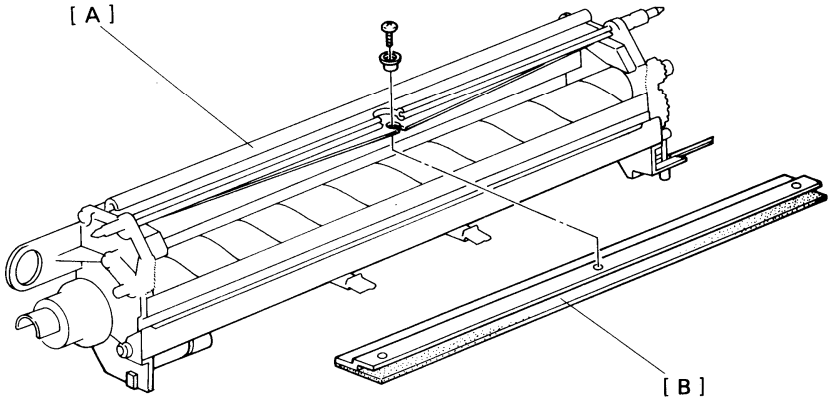
6. Remove the toner collection bottle [G].

7. Slide out the cleaning unit according to the following procedure:

When the pawl pin [H] is near the pick-off pawl lever [1], pull the cleaning unit [J] straight out (see illustration) until the pin releases from the lever. The weight of the cleaning unit will then cause it to lean away from the drum (see illustration). Continue pulling out the unit at this slant.

Repeat this procedure in reverse sequence to slide in the cleaning unit.

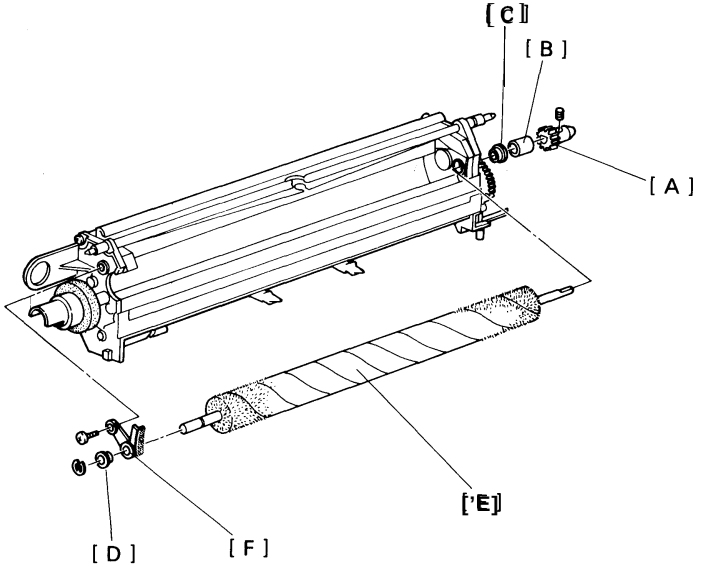
2. Cleaning Blade Replacement



1. Take out the cleaning unit [A]. (See Cleaning Unit Removal.)
2. Remove the cleaning blade [B] (1 screw and 1 bushing).
3. Install the new cleaning blade.

- Be careful not to touch the edge of the new blade.
- After installing the blade, make sure that the blade swivels.

3. Cleaning Brush Replacement



1. Remove the cleaning unit drive gear [A] (1 Allen screw), the collar [B], and the bushing [C] from the rear end of the cleaning brush shaft.

   Remove the bushing [D] from the front end (1 E-ring).

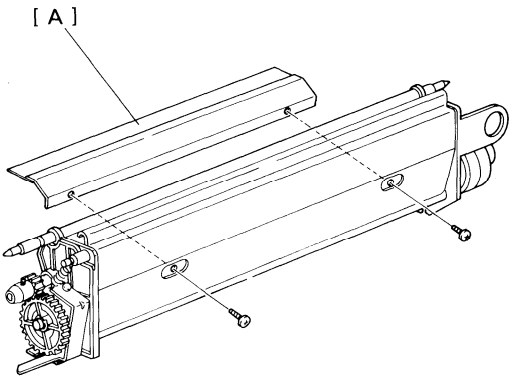
   Take out the cleaning brush [E] with the brush shaft holder [F] (1 screw).

4. Take the brush shaft holder off the front end.

5. Install the new cleaning brush and reassemble the unit.

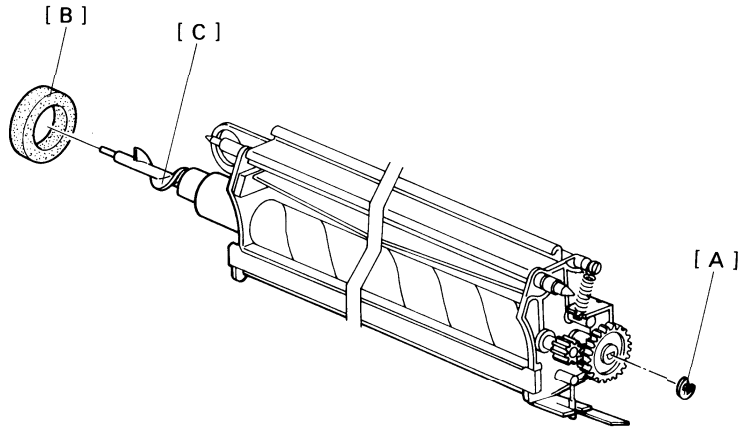
Do not touch the new brush; handle only the shaft.

4. Blade Scraper Replacement



1. Remove the cleaning blade. (See Cleaning Blade Replacement.)
2. Remove the cleaning brush. (See Cleaning Brush Replacement.)
3. Take out the blade scraper [A] (2 screws).
4. Clean the inside of the cleaning unit, and install a new blade scraper.

5. Toner Collection Coil Replacement

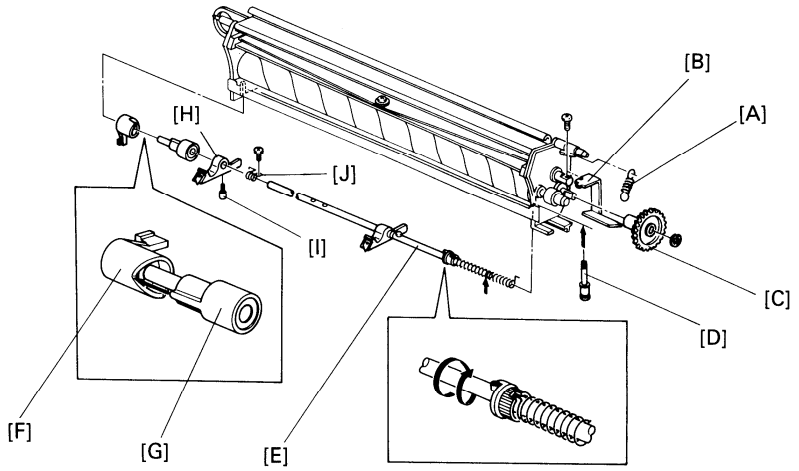


1. Remove the E-ring [A] from the toner collection coil shaft
2. Remove the bottle joint seal [B].
3. Slide out the toner collection coil [C] from the front side of the cleaning unit.

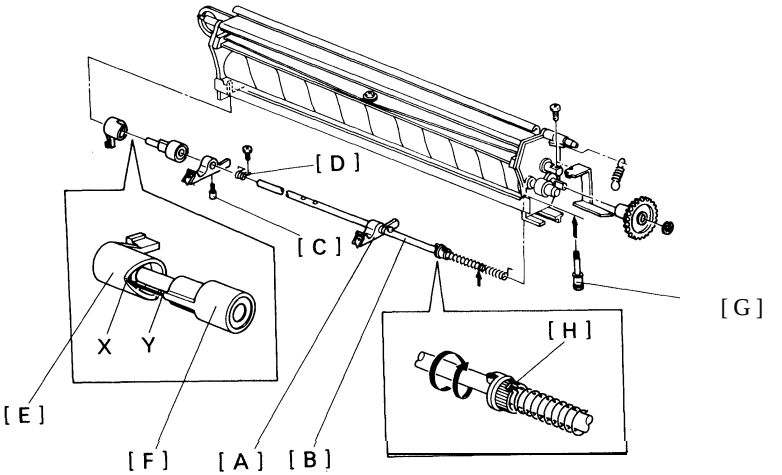
Toner will fall out when the coil is sild out of the cleaning unit.

4. Clean the inside of the unit and install a new toner collection coil.

6. Pick-off Pawl Replacement



1. Remove the release spring [A] and the pressure lever [B] (1 screw).
2. Remove the collection coil gear [C] from the the toner collection coil shaft (1 E-ring).
3. Remove the pawl shaft pin [D] from the pawl shaft [E].
4. Push the pawl shaft to the rear and slide off the cam holder [F] from the front side plate.
5. Take out the whole pawl shaft assembly.
6. Slide off the cam holder and cam rider [G].
7. Slide off the front pick-off pawl [H] (1 positioning pin [1]) and the front pawl spring [J] (1 screw).
8. Slide off the rear pick-off pawl (1 positioning pin).



9. Set new pick-off pawls [A] on the shaft [B] and position them with the positioning pins [C] and pawl springs [D].

10. Assemble the pawl shaft assembly and set it on the cleaning unit sliding in the rear end of the shaft to the rear side plate.

NOTE: - When installing the cam holder [E] and the cam rider [F], align X with Y as shown in the figure.

Make sure that the spring end is in the small hole on the rear side plate.

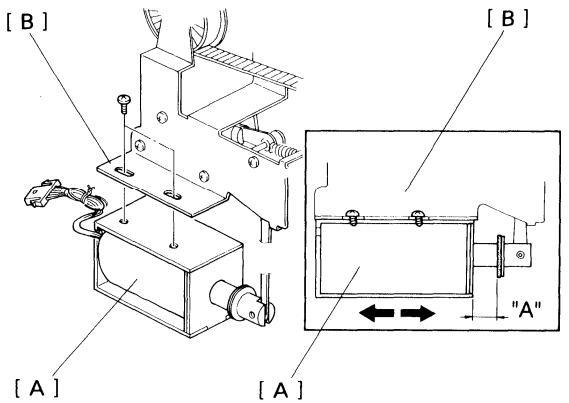
11. Install the pawl shaft pin [G].

12. Push the spring collar [H] to the rear and rotate it with one turn as shown in the figure. Then set the collar on the pin.

NOTE: Make sure that the end of the spring is correctly positioned in the groove of the collar.

13. Reassemble.

7. Cleaning Pressure Adjustment



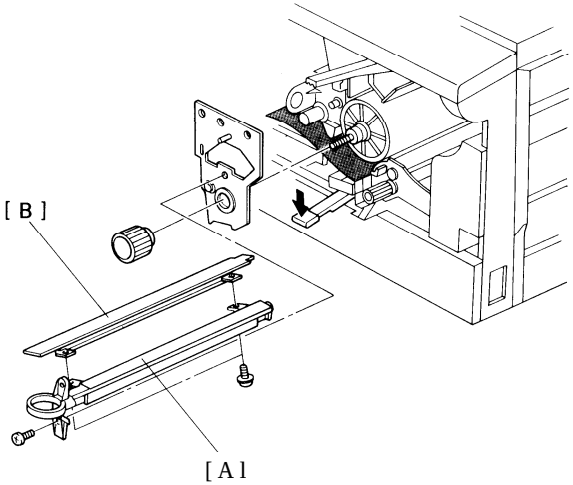
ADJUSTMENT STANDARD: A = 13 ± 0.5 mm (0.51" ± 0.02")

1. Turn off the main switch.
2. Remove the rear cover (2 screws).
3. Disconnect the fiber cables from the interface board if the OF is installed.
4. Lower the main PCB (2 screws).
5. Disconnect the ac harness from the T&S power pack and remove it (1 screw).
6. Lightly secure the cleaning solenoid [A] at the center of the bracket [B].
7. Position the cleaning solenoid to measure the gap "A", then secure the cleaning solenoid.

NOTE: When adjusting the gap **"A",** make sure that the solenoid plunger is all the way to the right.

QUENCHING

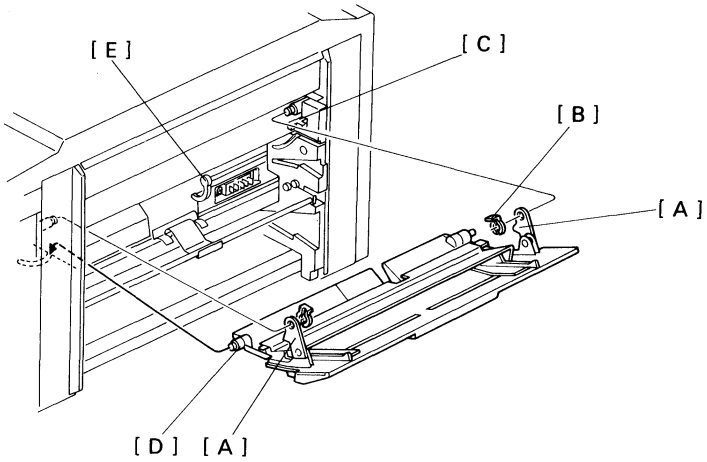
1. Quenching Lamp Replacement



1. Remove the charge corona unit [A] (1 screw).
2. Remove the quenching lamp [B] from the charge corona unit (2 screws).

PAPER FEED

1. Manual Feed Table Removal



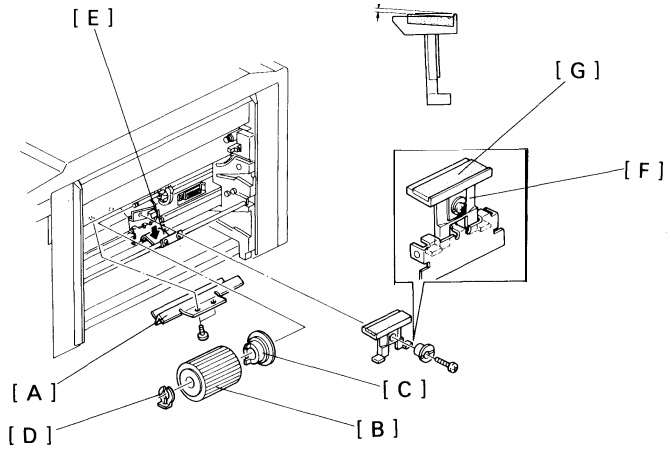
1. Remove the upper manual feed table hinges [A] from the copier (1 snap ring [B] each side).

Be careful not to damage the manual feed sensor [C].

2. Slide the lower manual feed table hinge pins [D] down their respective grooves to remove the table.

Be careful not to damage the paper end feeler [E].

2. Feed Rollers and Friction Pad Replacement



1. Remove the manual feed table (See Manual Feed Table Removal).
2. Remove the upper front guide plate [A] (2 screws).

NOTE: Steps 1 and 2 are for the 1st feed station only.

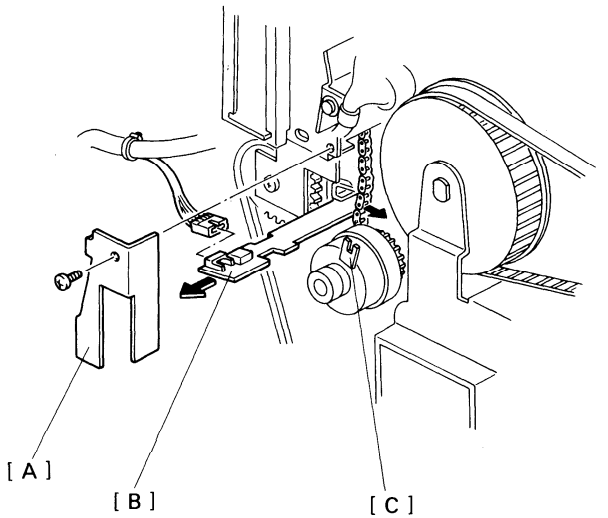
3. Remove the feed roller [B] and hub [C] (1 snap ring [D]).
4. Press down on the cassette arm [E] and remove the friction pad holder [F] (1 screw and 1 cam roller).
5. Strip the old friction pad [G] off and clean the surface of the friction pad holder.
6. Install the new friction pad.
7. Grease the friction pad holder swivel point with Mobil Temp 78.
8. Reinstall the friction pad holder (1 screw and 1 cam roller) while holding down the cassette arm.

NOTE: - Make sure the legs of the friction pad holder are positioned under the spring loaded pad positioning mechanism.

Adjust the gap between the feed roller and the friction pad. (See "Feed Roller/Friction Pad Gap Adjustment")

9. Reinstall the feed roller and hub (1 snap ring).

3. Registration Sensor Replacement



1, Remove the rear cover (2 screws) and lower the PCB plate (2 screws).

2. Remove the support bracket [A] (1 screw).

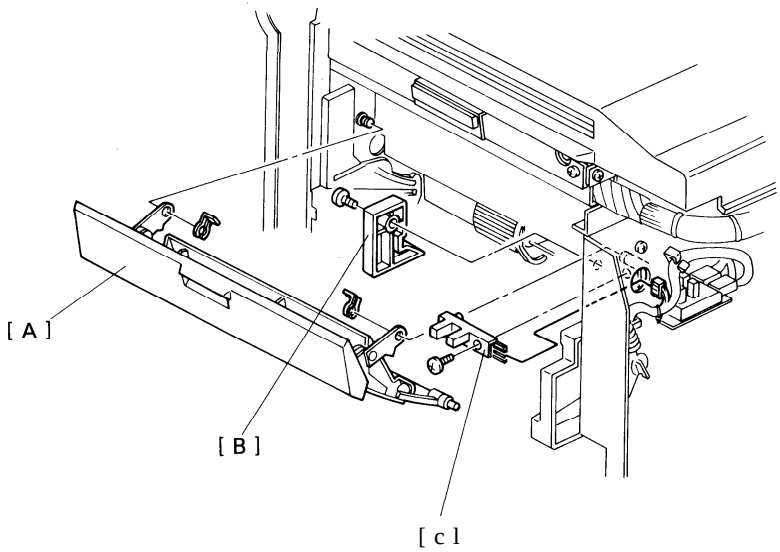
3. Move the main drive chain to the right of the PCB cut-out and slide out the registration sensor [B] (1 connector).

NOTE: - When sliding in the registration sensor board, make sure that the board is properly located on the rails.

When reinstalling the support bracket, make sure that the bracket is properly engaged with the groove of the registration clutch stopper [C].

The support bracket is responsible for holding the registration sensor in place; so, make sure it is correctly positioned.

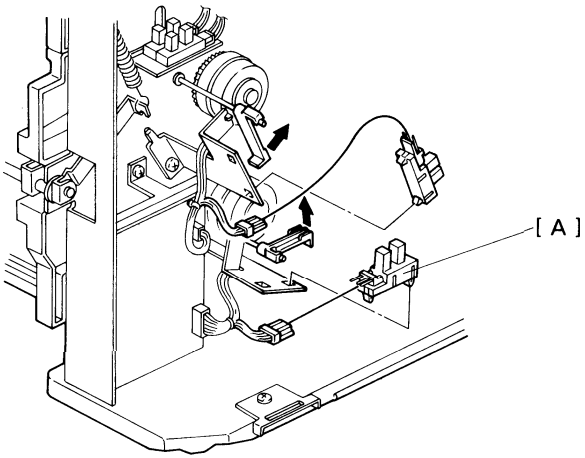
4. Manual Feed Sensor Replacement



1. Remove the manual feed table [A]. (See Manual Feed Table Removal.)
2. Remove the rear cover (2 screws).
3. Remove the right rear cover (2 screws).
4. Remove the sensor cover [B] (1 screw).
5. Remove the manual feed sensor [C] (1 screw, 1 connector).
6. Install a new sensor.

NOTE: Do not overtighten the screw **when securing** the new sensor.

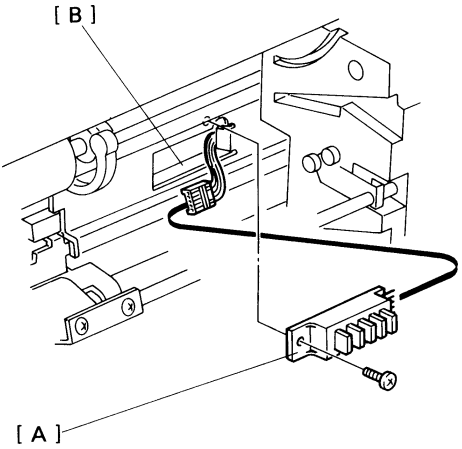
5. Paper End Sensor Replacement



1. Remove the rear cover (2 screws).
2. Remove the paper end sensors [A] (1 connector each).

Be careful not to damage the paper end sensor actuators.

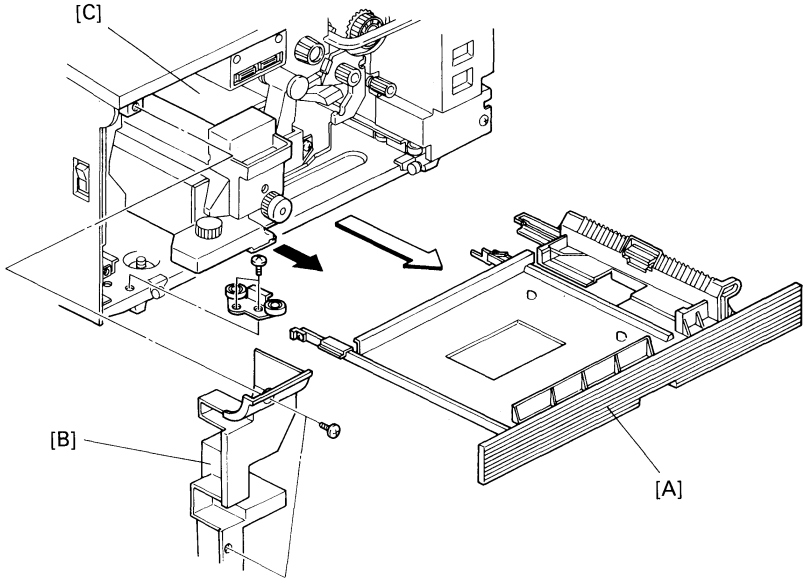
6. **Paper Size Sensor Replacement**



1. Remove the paper size sensor [A] from the sensor bracket [B] (1 screw and 1 connector).
2. Install a new sensor. Position the projection of the sensor in the hole of the sensor bracket.

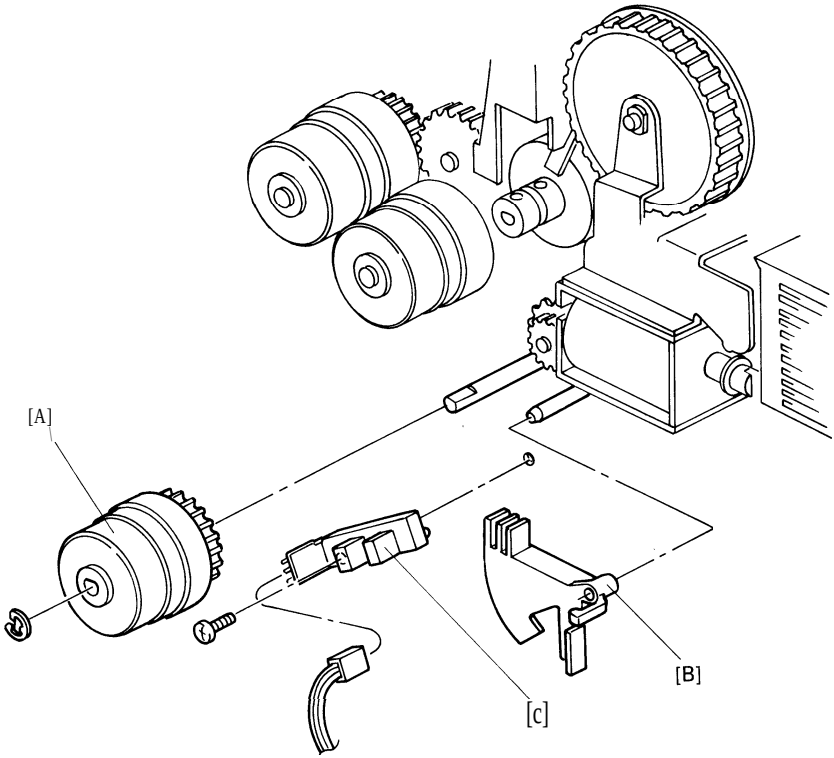
NOTE: Do not overtighten the screw when securing the new sensor.

7. **Cassette Tray Removal**



1. Open the front doors and pull out cassette tray [A].
2. Remove the left inner cover [B] (2 screws).
3. Pull the fusing unit [C] about one third of the way out
4. **Remove the left guide roller bracket [D]** (2 screws).
5. Remove the cassette tray.

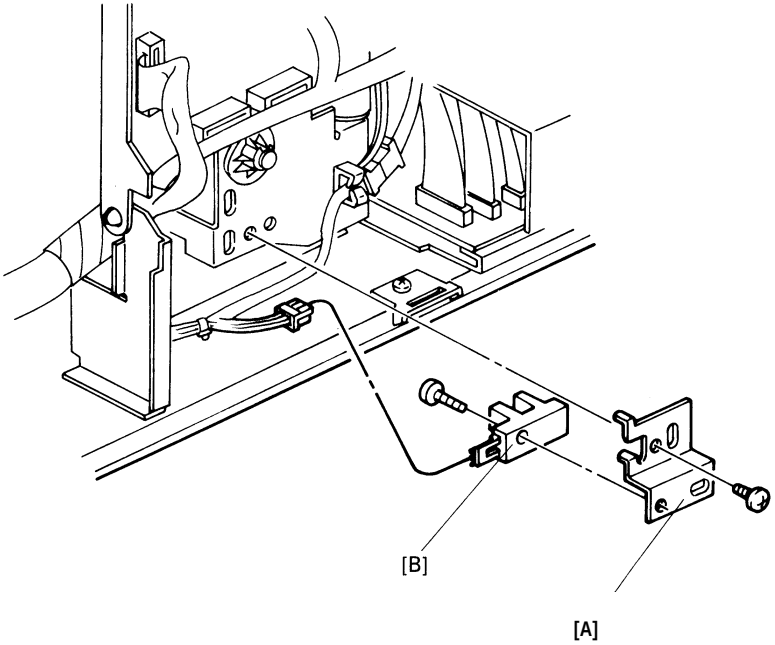
8. Paper End Sensor Replacement (Cassette Tray)



1. Remove the rear cover (2 screws).
2. Remove the PCB plate supporter (1 screw).
3. Remove the 3rd paper feed clutch [A] (1 E-ring).
4. Remove the paper end sensor actuator [B].
5. Replace the paper end sensor [C] (1 screw and 1 connector).

NOTE: When reinstalling the sensor, make sure that the actuator is properly aligned; do not overtighten the screw.

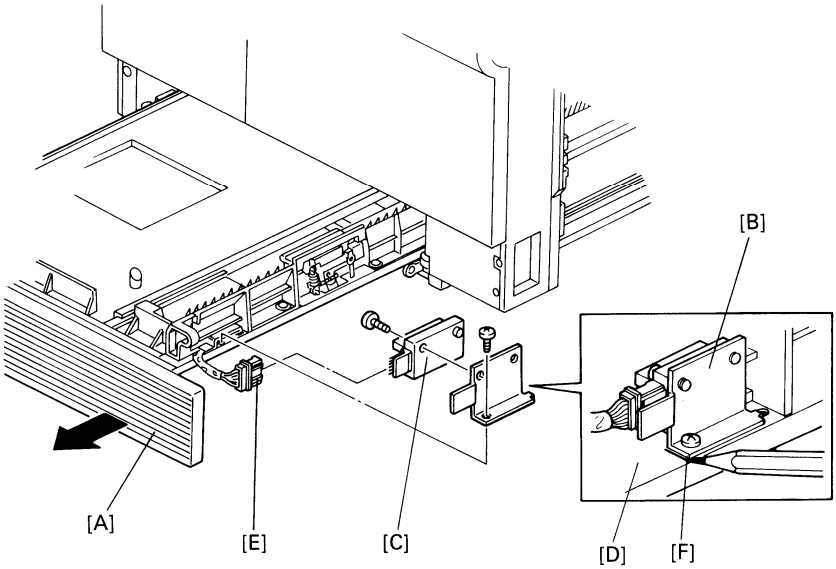
9. Cassette Tray Sensor Replacement (Cassette Tray)



1. Remove the rear cover (2 screws).
2. Remove the cassette tray sensor bracket [A] as well as the sensor [B] (1 screw and 1 connector).
3. Replace the sensor (1 screw).

NOTE: Do not overtighten the screw when securing the new sensor.

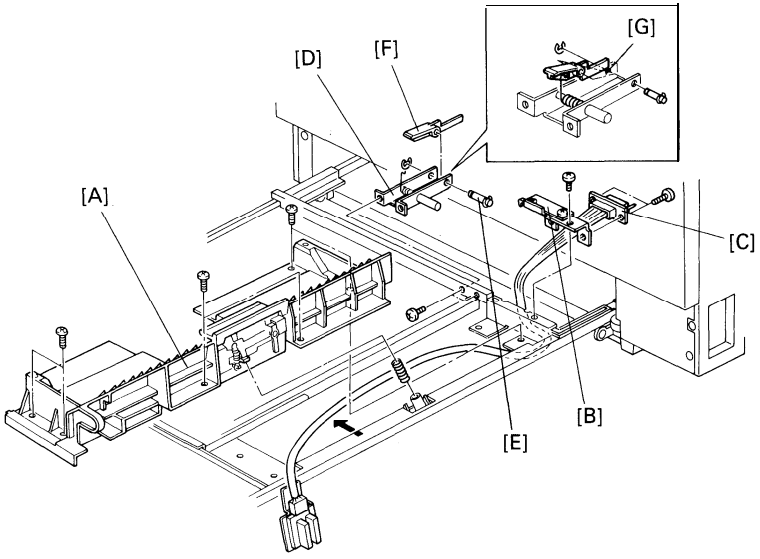
10. Paper Size Sensor Replacement (Cassette Tray)



1. Pull out the cassette tray [A].
2. After marking the position of the paper size sensor bracket [B], remove it as well as the sensor [C] (1 screw) on the frame [D].
3. Disconnect the paper size sensor connector [E].
4. Replace the sensor (1 screw).

NOTE: - Do not overtighten the screw when securing the sensor.
- Be sure to align the sensor bracket with the marked line [F].

11. Paper Size Sensor harness Removal (Cassette Tray)



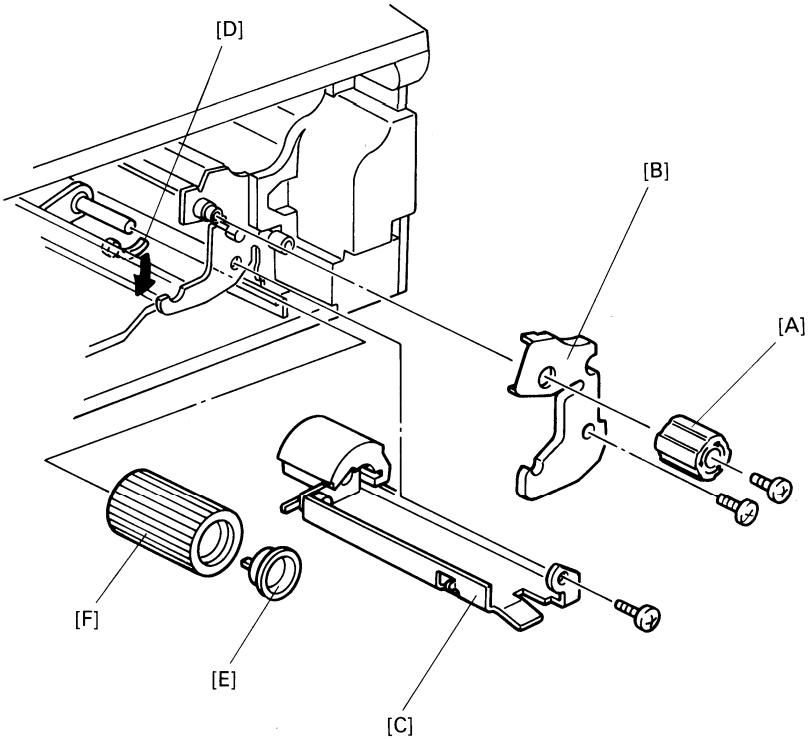
1. Pull out the cassette tray.
2. Remove the paper size sensor bracket and disconnect the paper size sensor connector (See “Paper Size Sensor Replacement.”).
3. Remove the paper guide plate [A] (6 screws).
4. Remove the terminal bracket [B] (1 screw).
5. Remove the terminal [C] (1 screw).

12. Cassette Tray Feeler Removal

1. Pull out the cassette tray.
2. Remove the sensor feeler bracket [D].
3. Remove the sensor feeler pin [E] (1 E-ring) and the sensor feeler [F].

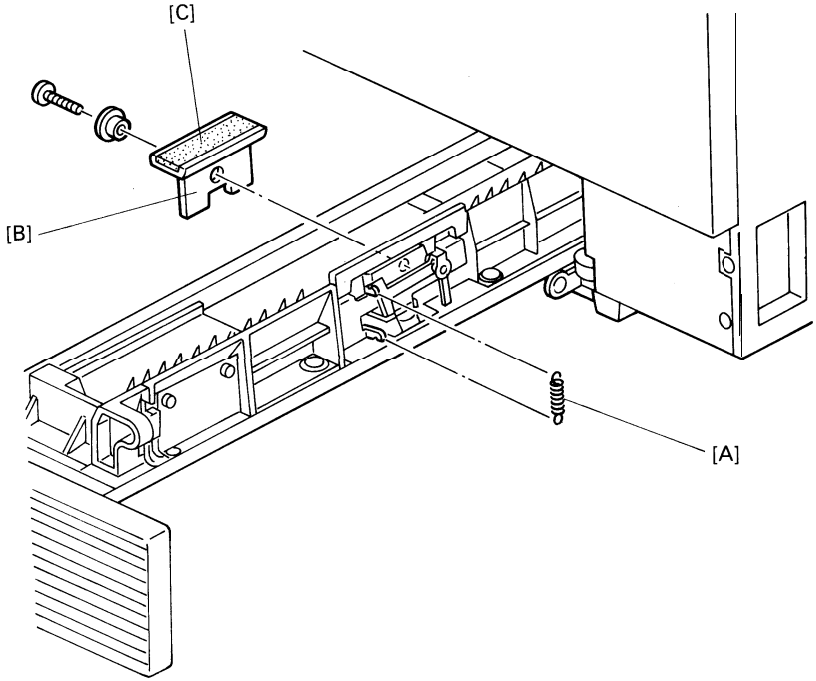
NOTE: When installing the sensor feeler, make sure that the spring [G] is properly positioned as shown.

13. **Feed Roller Replacement (Cassette Tray)**



1. Open the front doors and pull out the cassette tray
2. Remove the registration roller knob [A] and the small inner cover [B] (1 screw each).
3. Remove the balance wheel bracket [C] (1 screw).
4. While pressing down the paper **end** sensor feeler [D], remove the hub [E] and the feed roller [F].

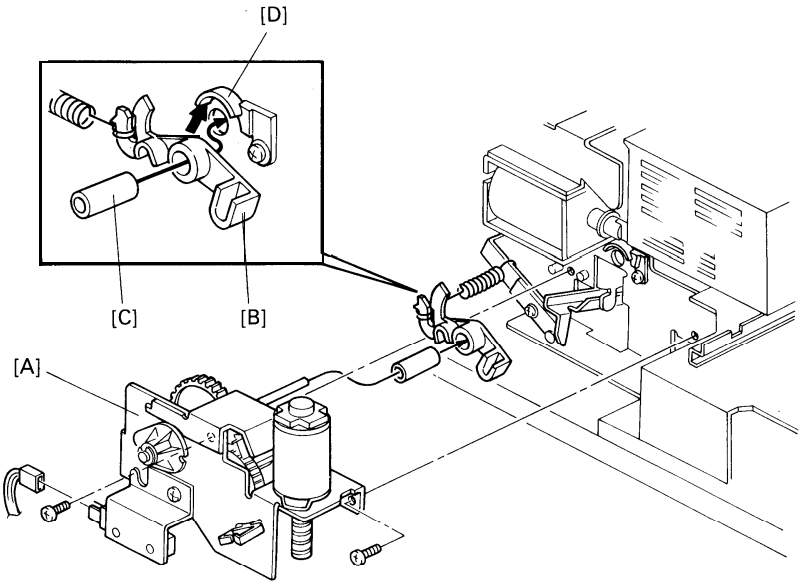
14. Friction Pad Replacement (Cassette Tray)



1. Pull out the cassette tray.
2. Unhook the pressure spring [A].
3. Remove the friction pad holder [B] (1 screw and 1 collar washer).
4. Strip off the old friction pad [C] and clean the surface of the friction pad holder.
5. Install the new friction pad.

NOTE: - Do not touch the surface of the new friction pad with oily fingers. -
- Check that the friction pad is 0.05 to 0.35 millimeters below the surface of the front lip.

15. Lift Motor Removal



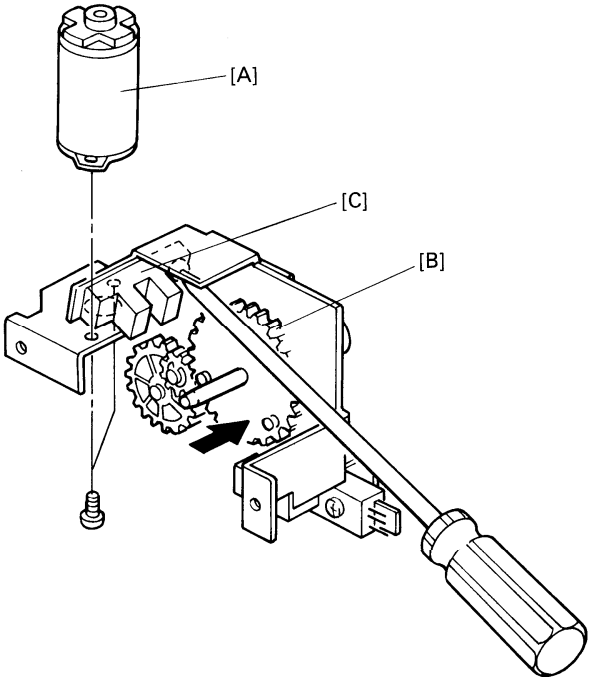
1. Pull out the cassette tray and remove the rear cover (2 screws).

2. Disconnect the lift sensor, set sensor, and the lift motor connectors.

3. Remove the lift unit [A].

NOTE: **-** When installing the lift motor unit, first the tray lift actuator lever [B] and the collar [C] on the rear guide plate if they were removed.
- Be sure that the tray lift motor lever is positioned behind the tray lift guide [D].

16. Lift Motor Replacement



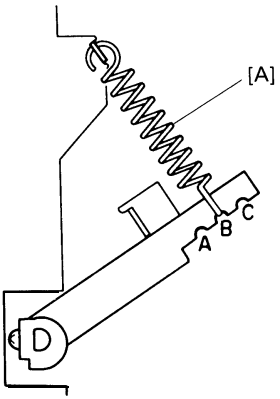
1. Remove the lift unit (See “Lift Unit Removal).
2. Remove the lift motor [A] (2 screws).

17. Lift Sensor Replacement

1. Remove the lift unit (See “Lift Unit Removal”).
2. While pushing the release gear [B] in the direction of the arrow, remove the lift sensor [C] (1 screw).

NOTE: Do not overtighten the screw when securing the new sensor.

18. **Feed Pressure Adjustment**

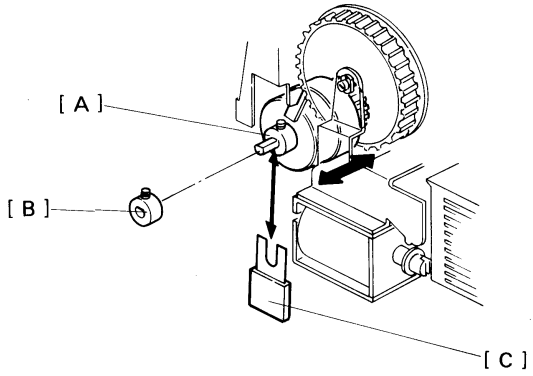


1. Remove the rear cover.

2. Move the pressure spring [A] to the desired position (see the following table).

Setting	Feed Pressure	Function
A	**350 g**	To prevent multi-feed.
B	**400 g**	*Factory setting
C	**450 g**	To prevent feed jam.

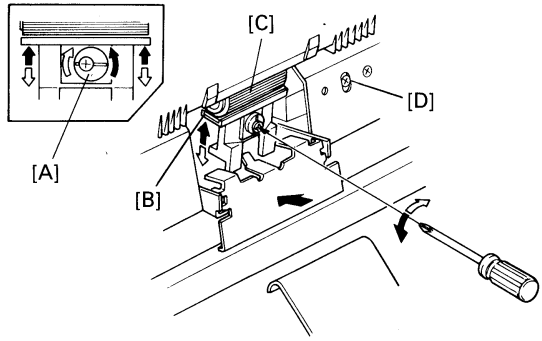
19. Registration Clutch Adjustment



ADJUSTMENT STANDARD: 0.1 mm (0.004")

1. Remove the rear cover (2 screws).
2. Take the adjusting collar [A] off the registration roller shaft (1 Allen screw).
3. Loosen the screw in the lock collar [B] on the clutch which is to be adjusted (1 Allen screw).
4. Place the adjusting collar next to the lock collar on the clutch shaft.
5. Position a 0.1 mm gap gauge [C] (Part number #52059101) between the two collars.
6. Push the collars and the thickness gauge back until the clutch presses against the rear plate. Tighten the Allen screw in the adjusting collar.
7. Remove the thickness gauge and move the lock collar against the adjusting collar. Tighten the Allen screw in the lock collar.

20. **Feed Roller/Friction Pad Gap Adjustment (1st and 2nd Feed Station)**



NOTE: The friction pad pressure has already been adjusted for copy paper of normal weight and quality, When replacing the friction pad, it is only necessary to make sure that the groove on the eccentric cam [A] is aligned horizontally as shown in the figure above.
However, if certain nonstandard types of copy paper are used and multifeeds or misfeeds occur, turn the eccentric cam to adjust the pressure.

When replacing the friction pad :

ADJUSTMENT STANDARD: 1.8 0.2 mm (0.07" ± O.008")
(If the eccentric cam groove is aligned horizontally, the gap between the friction pad [B] and the feed roller [C] will be within the adjustment standard.)

1. Horizontally align the groove on the eccentric cam.

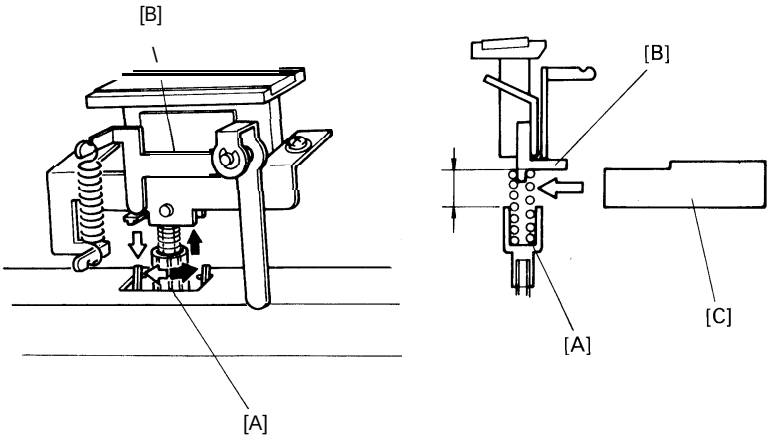
When multifeeds or misfeeds occur:

1. Turn the eccentric cam to adjust the friction pad pressure.

Clockwise:	The gap is decreased	**(To prevent misfeeds).**
Counterclockwise:	The gap is increased	**(To prevent multifeeds).**

Do not adjust the sunk screw [D]. They are factory pre-set.

21. Feed Roller/Friction Pad Gap Adjustment (Cassette Tray)

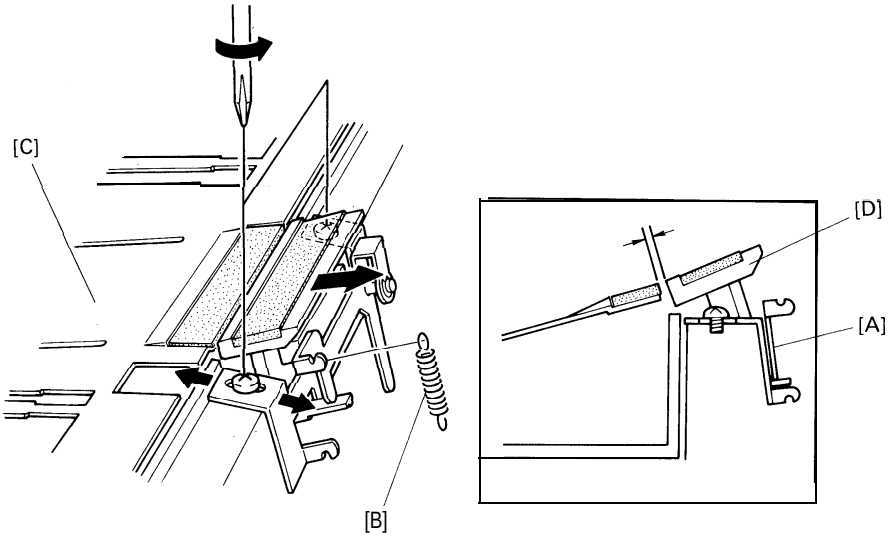


ADJUSTMENT STANDARD: 7.3 ± 0.3 mm (0.29" ± 0.01")

1. Remove the 1st and 2nd cassette or large capacity tray if it is installed.
2. Confirm that the cassette tray (3rd cassette) is securely inserted into the machine.
3. Measure the gap between the friction adjusting screw [A] and the friction pad guide [B] using a gap guide [C].
4. If the gap is not within the adjustment standard, adjust the gap by turning the friction adjusting screw.

Clockwise:	The gap is increased **(To prevent multifeed).**
Counterclockwise:	The gap is increased **(To prevent misfeed).**

22. Friction Pad Holder Position Adjustment (Cassette Tray)

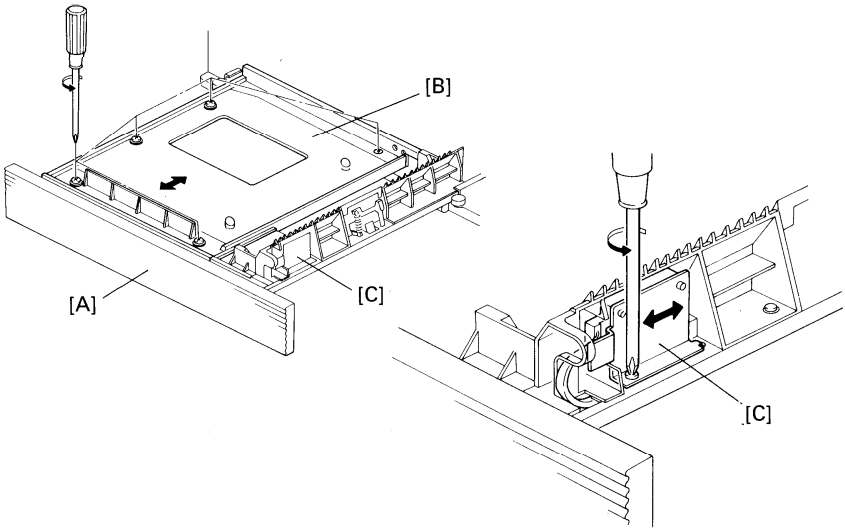


Adjustment Standard: 1.7 ± 0.2 mm (0.07" ± 0.008")

NOTE: After reinstalling the friction pad bracket [A], this adjustment is necessary to prevent wrinkling at the leading edge of the paper.

1. Remove the pressure spring [B].
2. Temporarily secure the friction pad bracket.
3. Place the empty cassette into the cassette tray.
4. Lift and position the bottom plate [C] as shown in the figure. Push the friction pad holder [D] in the direction of the arrow.
5. Adjust the position of the friction pad bracket so that the gap is within the standard.
6. Tighten the securing screw.

23. **Horizontal Registration Adjustment (Cassette Tray)**



ADJUSTMENT STANDARD: O ± 2 mm (0±0.08")

1. Pull out the cassette tray [A].
2. Remove the Cassette.
3. Loosen the 5 screws securing the bottom plate [B] to the cassette tray and reposition the bottom plate. Retighten the screws.
4. Check the registration by making a copy. If the registration is not, with in Standard, perform step 3 again.
5. After adjusting the bottom plate position, perform the following:

   a) Place each size cassette into the cassette tray and close the tray.

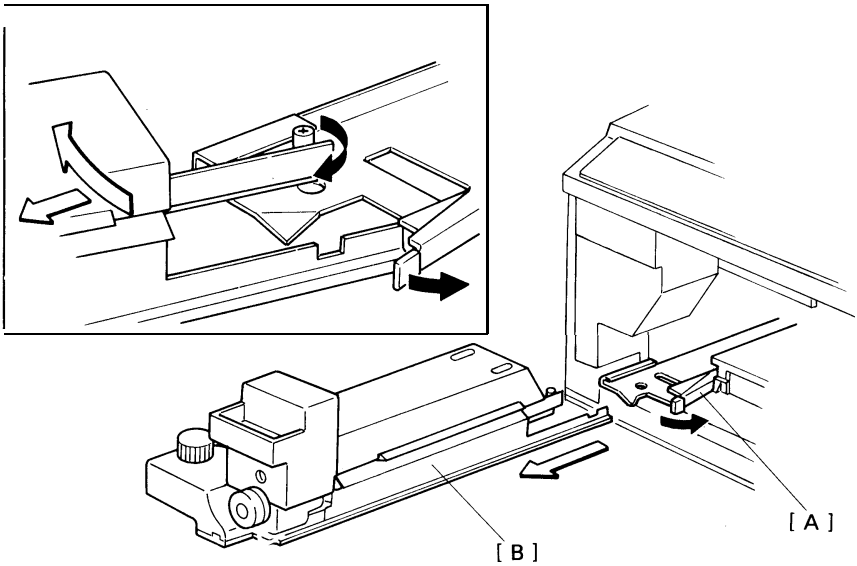
   b) Confirm that the Paper Size indicator lights and correctly indicates the paper size of the cassette installed in the tray.

   c) If the indicator is not correct, adjust the position of the paper size. sensor bracket.

   d) Continue this procedure until all cassettes are indicated properly.

FUSING

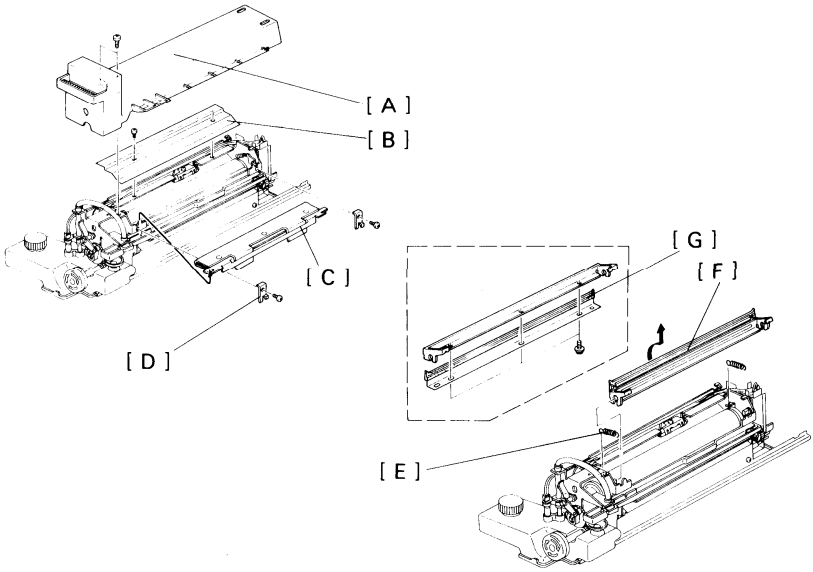
1. Fusing Unit Removal



1. Open the left and right front doors.
2. Push the fusing unit release lever [A] to the right.
3. Pull out the fusing unit [B] until it is fully extended.
4. Push the fusing unit release lever to the right, move the fusing unit to the left to disengage the stopper pin [C], and remove the unit from the copier.

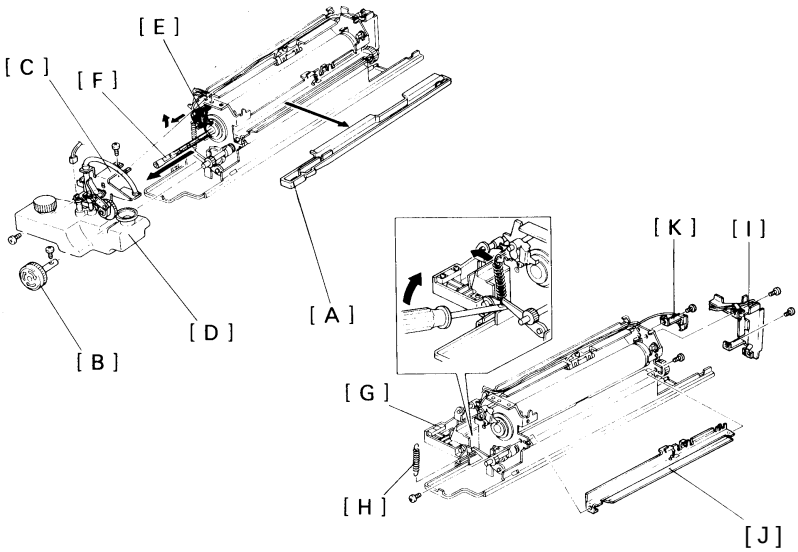
NOTE: Keep the fusing unit in an upright position so that silicone oil does not spill.

2. Oil Blade Replacement



1. Remove the fusing unit. (See Fusing Unit Removal.)
2. Remove the fusing unit cover [A] (2 screws).
3. Remove the pressure plate [B] (2 screws).
4. Remove the oil supply pad [C] (2 screws and 2 clamp plates [D]).
5. Unhook the two tension springs [E].
6. Turn and remove the oil blade assembly [F].
7. Remove all screws (3) from the oil blade assembly and remove the blade [G].

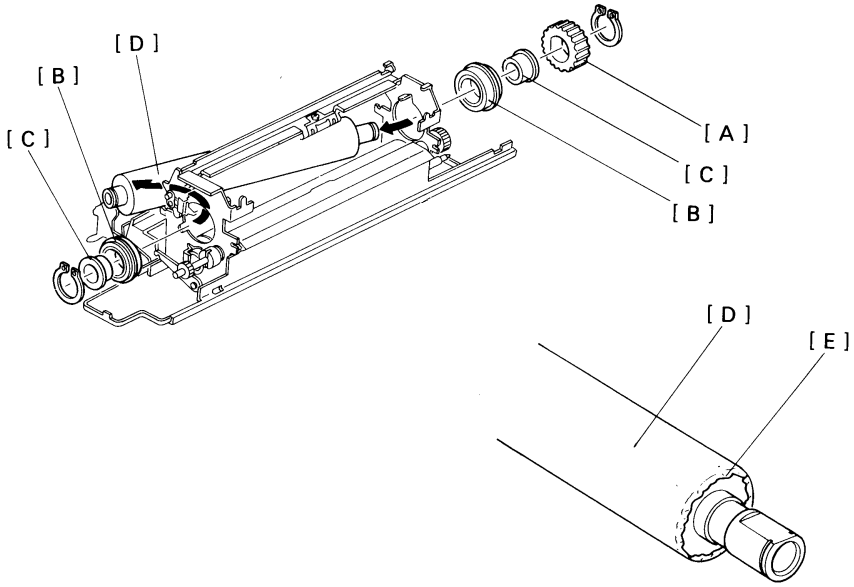
3. Hot Roller Replacement



1. Remove the oil blade. (See Oil Blade Replacement.)
2. Remove any excess oil from the area surrounding the oil sump [A] and remove the oil sump.
3. Remove the fusing unit knob [B] (1 screw).
4. Remove the oil pump mechanism [C] with the oil tank [D] (2 screws and 1 connector).
5. Rotate the front lamp terminal [E] and remove the fusing lamp [F].

Do not touch the fusing lamp with oily fingers because oil marks may damage the lamp.

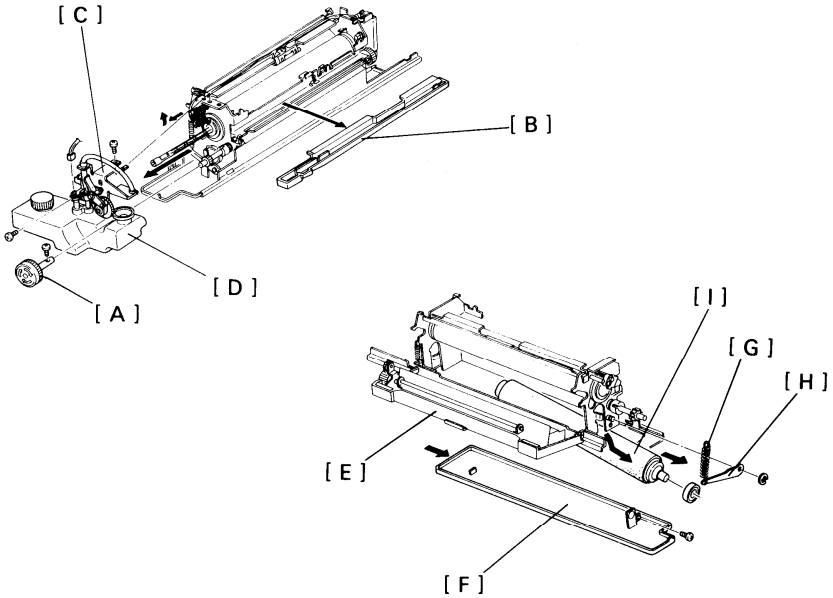
6. Swing down the fusing exit assembly [G] and unhook the pressure springs [H].
7. Remove the harness support bracket [1] (2 screws and 2 hooks).
8. Remove the thermistor bracket [J] (2 screws).
9. Remove the rear lamp terminal [K] (1 screw and 1 hook).



10. Remove the hot roller gear [A], bearings [B], and the collars [C] from both ends of the hot roller [D] (1 C-ring each).
11. Slide the hot roller slightly to the rear and remove the hot roller as shown.
12. Tear the protective paper [E] from the ends of a new hot roller and install it.
13. After the new hot roller is installed, remove the protective paper.

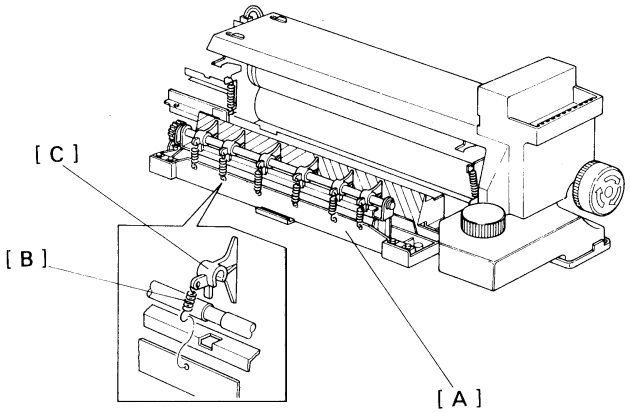
NOTE: When reinstalling the fusing lamp, make sure it does not touch the inside of the hot roller.

4. Pressure Roller Replacement



1. Remove the fusing unit and cover (2 screws).
2. Remove the fusing unit knob [A] (1 screw).
3. Remove any excess oil from the oil sump [B].
4. Remove the oil pump mechanism [C] with the oil tank [D] (2 screws and 1 connector).
5. Open and remove the fusing exit assembly [E] (1 E-ring, 1 connector, and 2 springs).
6. Remove the oil pan [F] (4 screws and 4 hooks).
7. Remove the front pressure spring [G].
8. Remove the front pressure lever [H] (1 E-ring).
9. Lift up the upper part of the fusing unit and remove the pressure roller [1].
10. Install the bearings [J] on the new pressure roller.

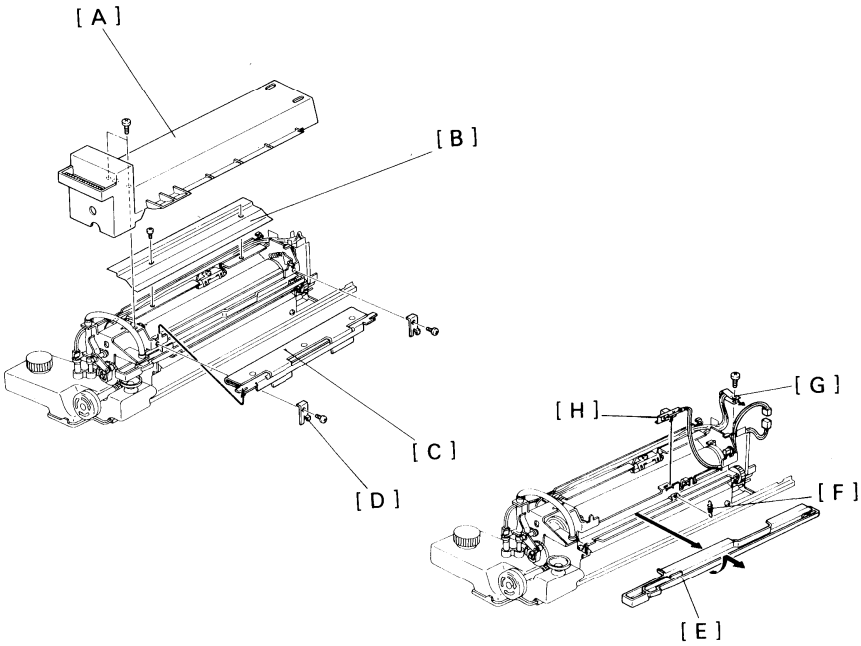
5. Hot Roller Stripper Replacement



1. Pull out the fusing unit and open the fusing exit assembly [A].
2. Unhook the springs [B] and remove the hot roller strippers [C].
3. Install new strippers and connect the springs.

NOTE: It is best to replace strippers and springs as a set.

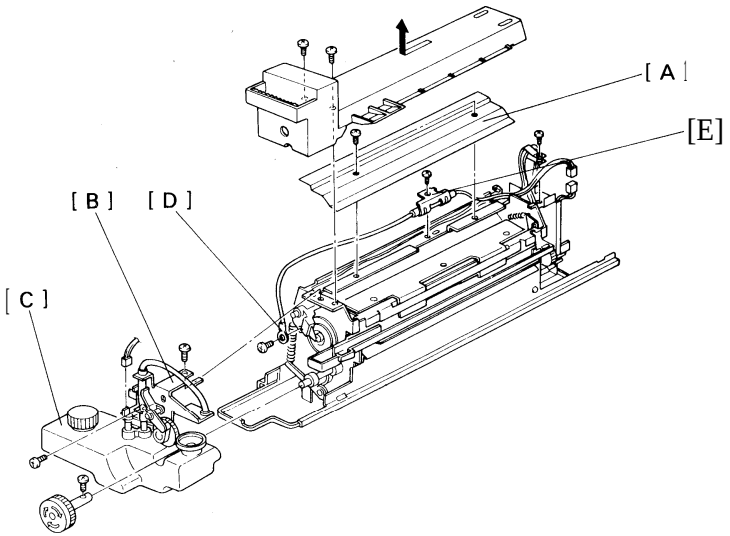
6. **Thermistor Replacement**



1. Remove the fusing unit.
2. Remove the fusing unit cover [A] (2 screws).
3. Remove the pressure plate [B] (2 screws).
4. Remove the oil supply pad [C] (2 screws and 2 clamp plates [D]).
5. Remove any excess oil from the oil sump and remove the oil sump [E].
6. Unhook the thermistor spring [F].
7. Remove the thermistor wire from the metal wire clamp [G] (1 screw) and remove the thermistor [H] (1 connector).
8. Replace the thermistor and reassemble.

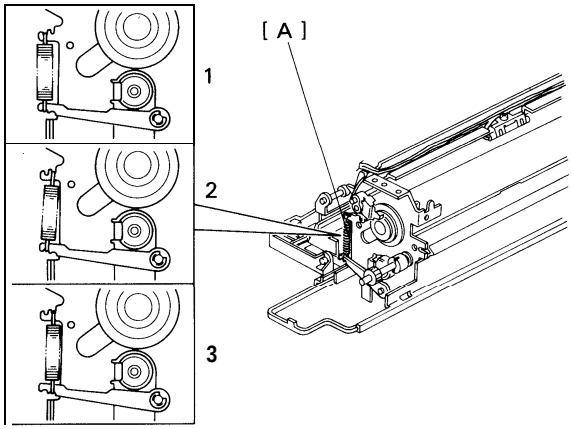
NOTE: Make sure that the thermistor is properly in contact with the hot roller.

7. Thermofuse Replacement



1. Perform steps 1 to 3 of “Thermistor Replacement”.
2. Remove the thermofuse bracket [A] (1 screw).
3. Remove the oil pump mechanism [B] with the oil tank [C] (2 screws and 1 connector).
4. Remove the thermofuse wire from the front lamp terminal [D] (1 screw).
5. Disconnect the thermofuse [E] (1 connector) and install the new thermofuse.

8. Fusing Pressure Adjustment

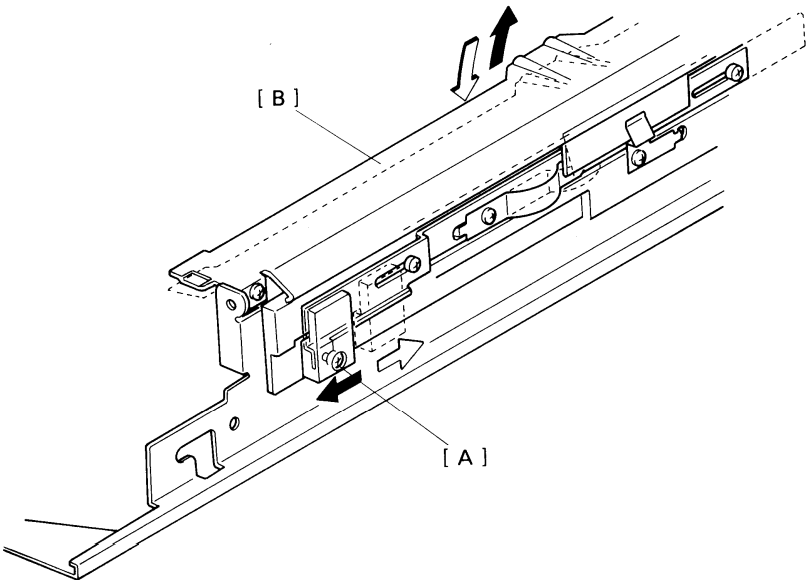


1. Remove the fusing unit.
2. Remove the fusing unit cover (2 screws).
3. Remove the fusing unit knob (1 screw).
4. Remove the oil pump mechanism along with the oil tank **(2** screws, 1 connector),
5. Move the pressure springs [A] to the desired position, See the following table:

Setting	Fusing Pressure	
1	11.9kg	
2	14.9 kg	* Factory Setting
3	16.7 kg	

NOTE: Position the front and rear springs in the same position.

9. Entrance Guide Height Adjustment



1. Remove the fusing unit.
2. Move the knob [A] to the front to raise the fusing guide plate [B].

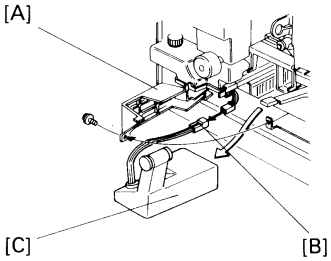
   Move the knob to the rear to lower the fusing guide plate.

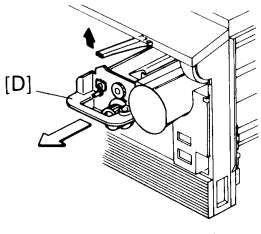
   (The movement range is 1 mm.)

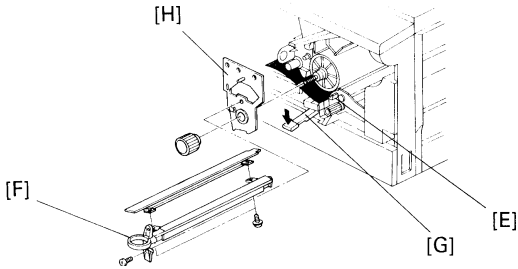
NOTE: Normally, the entrance guide is set in the lower position (factory setting). Set it in the upper position if paper creasing occurs.

TRANSPORT

1. Transport Unit and Transport Belt Removal



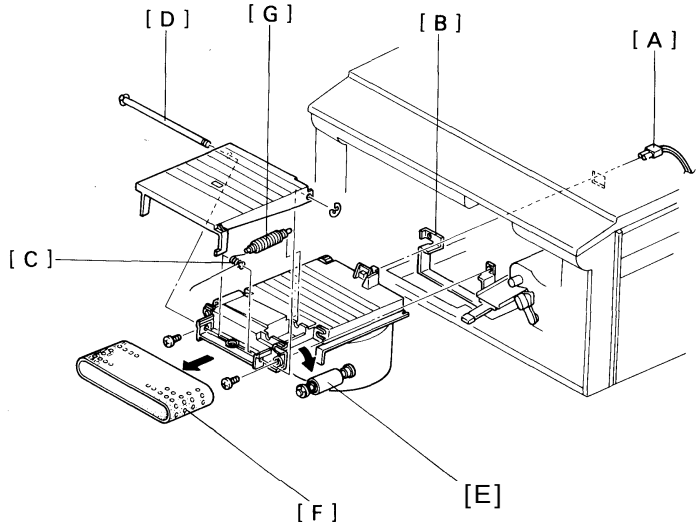




1. Swing the toner collection bottle cover [A] to the left (1 screw).
2. Disconnect the toner overflow sensor connector [B].
3. Remove the toner collection bottle [C].
4. Remove the development unit [D], PTL board [E], and the charge corona unit [F] (1 screw).
5. Lower the T/S corona unit [G].
6. Remove the drum stay [H] (1 knob [1] and 1 screw), the cleaning unit and the drum.

NOTE: Be sure the protective sleeve is installed before removing the drum.

7. Remove the fusing unit.

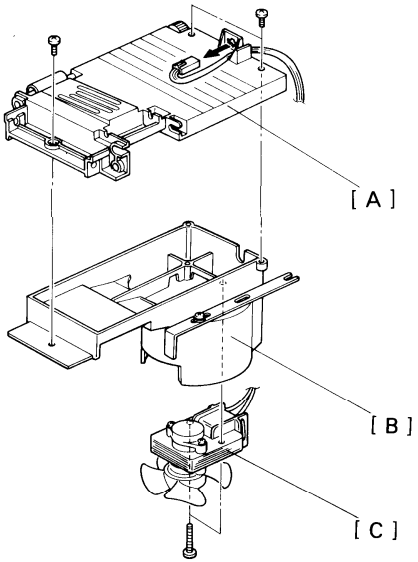


8. Remove the rear cover and lower the PCB plate (2 screws each).
9. Remove the transport and separation power pack (1 screw).
10. Disconnect the vacuum fan connector [A] (2p white) just under the main motor.
11. Remove the transport unit from the mounting bracket [B] (2 screws).
12. Slide the transport unit and vacuum fan out of the copier.

NOTE: When reinstalling the transport unit, be sure the transport gear engages with the drive gear.

13. Remove the front of the transport unit as shown (1 E-ring, 1 spring [C] and 1 shaft [D]).
14. Pull the right transport roller [E] and transport belt [F] to the right and remove the transport rollers [G].
15. Remove the transport belt as shown.

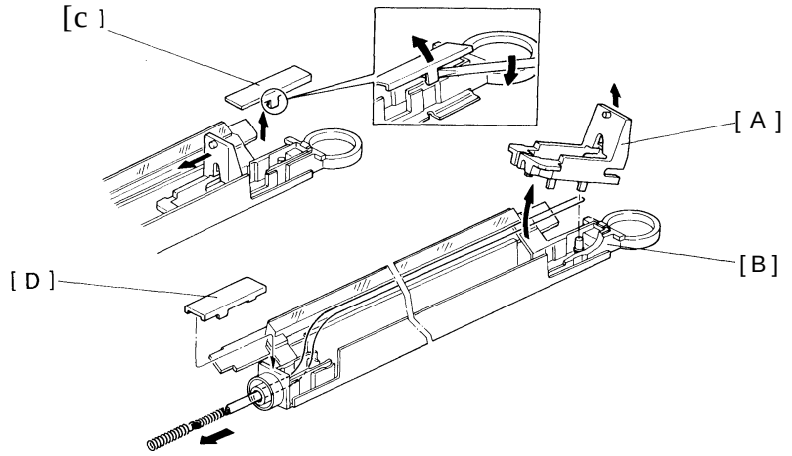
2. Vacuum Fan Motor Replacement



1. Remove the transport belt. (See Transport Unit and Transport Belt Removal.)
2. Remove the transport plate [A] from the vacuum fan unit [B] (3 screws and 1 connector).
3. Remove the fan motor [C] (2 screws).

CORONA

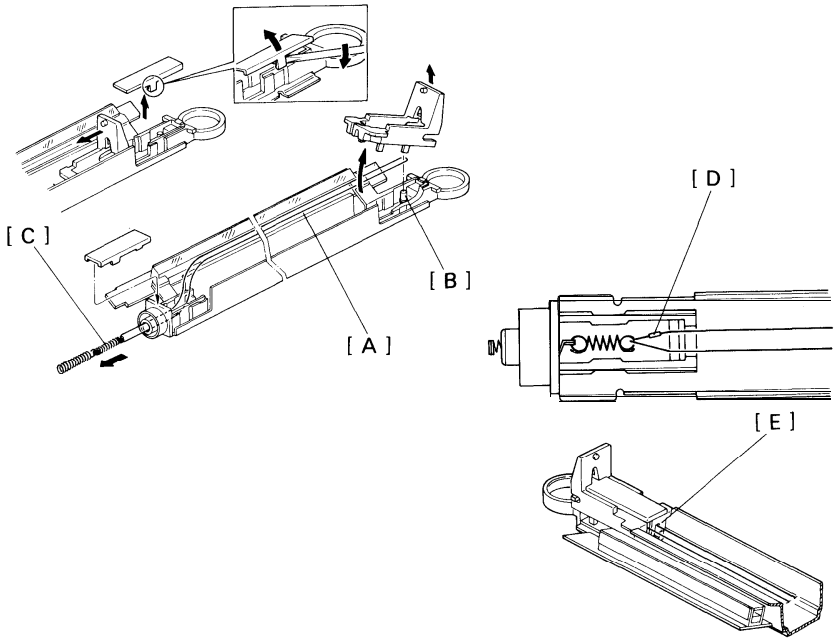
1. Corona Wire Replacement



- **Do not handle new corona wires with your bare hands. Oil on the wire will cause uneven charge on the drum.**
- **Do not rub the corona wires with rough material (sandpaper, etc.) as it will damage the corona wires.**
- **When removing the endblock covers, be careful not to break off the side hooks.**
- **Do not use any solvents to clean the wire as it will cause uneven charge on the drum.**

- Charge Corona Wire -

1. Slide the wire cleaner [A] away from the front endblock [B] as shown.
2. Remove the front [C] and rear [D] end block covers.
3. Slide the wire cleaner back to the front end and remove it.



4. Unhook the corona wire [A] from the front anchor post [B] by pulling in the direction of the arrow using a small screw driver.

5. Remove the old corona wire.

6. Clean the endblocks, the covers, and the corona unit casing with a blower brush and dry cloth.

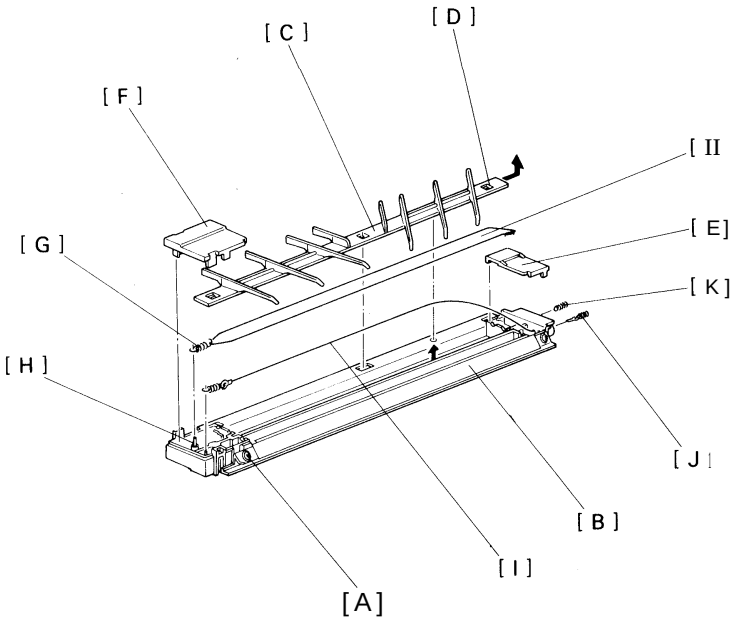
7. Hook the new corona wire onto the tension spring [C]

8. Hook the other end of the wire onto the front anchor post using a small screw driver.

When installing the corona wire, the wire junction [D] should be positioned inside the rear endblock.

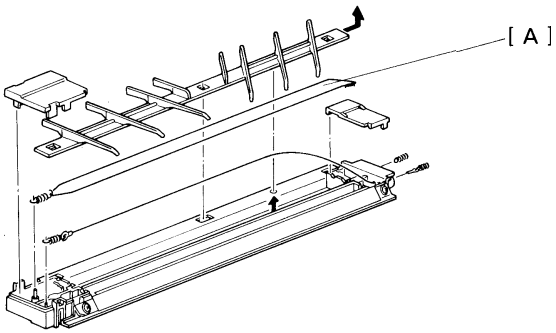
9. Reassemble the charge corona unit. Make sure that the corona wire is positioned between the cleaner pads [E].

- T/S Corona Wires -



The eccentric cams [A] are used in the production line oniy to adjust the gap between the guide mylar [B] and the selenium drum.

1. Lower the transport and separation unit then remove it.
2. Slide the corona paper guide [C] to the rear, by pushing up the guide stopper [D] from underneath. Then, remove the guide from the corona unit.
3. Remove the front [E] and rear [F] endblock covers.
4. Unhook the tension springs [G] from the front anchor posts [H] and remove the old corona wires [1].
5. Clean the corona paper guide, the endblocks and covers, and the corona unit casing with a blower brush and dry cloth.
6. Thread the small eyelet [J] of the new transfer corona wire through the hole in the rear endblock and hook it onto the terminal spring [K].

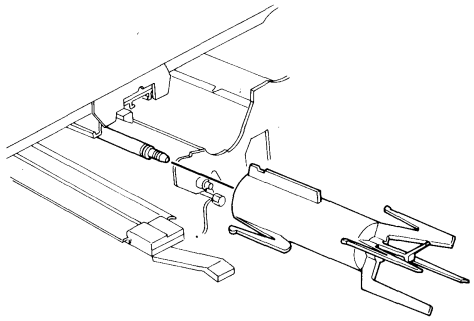


7. Hook the tension spring onto the other end of the corona wire. Then hook the tension spring onto the front endblock anchor post.
8. Insert the wire junction [A] of the new separation corona wire through the hole in the rear endblock and hook the terminal spring onto the nearby wire junction.
9. Hook the tension spring onto the other end of the loop and then hook the spring onto the front endblock anchor post.

The separation corona wire should be properly positioned in the grooves of the front and rear endblocks.

10. Reset the endblock covers and the corona paper guide.

2. Drum Current Adjustment



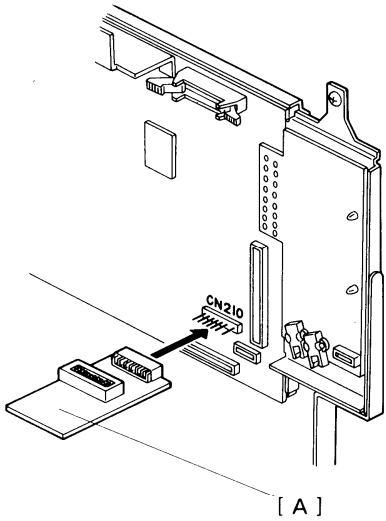
NOTE: The drum currents vary with environmental conditions such as humidity and atmospheric pressure. Generally it is not necessary to adjust the drum currents because they have already been adjusted for a range of environments at the factory.
Drum current adjustment may be required when there are problems with paper separation, incomplete toner transfer, or image density.

- Make sure that the main switch is turned off when you change the range on a digital multimeter. If not, the multimeter may be damaged.
- Take care as high voltage is applied to the corona wires when the main switch is turned on.

- Preparation -

1. Turn off the main switch and remove the following parts:

- Development unit
- Charge corona unit (1 screw)
- Drum stay (1 screw)
- Toner collection bottle
- Cleaning unit
- Drum flange
- Drum - should be covered with a shielding sleeve
- Drum guide
- T/S corona unit



2. Clean or replace each corona wire. Also clean the corona units and the cleaning unit.

3. Actuate the front safety switch.

4. Remove the rear cover (2 screws).

5. Plug the switching board into connector CN210 of the main board as shown.

NOTE: All the switches on the switching board [A] should be off.

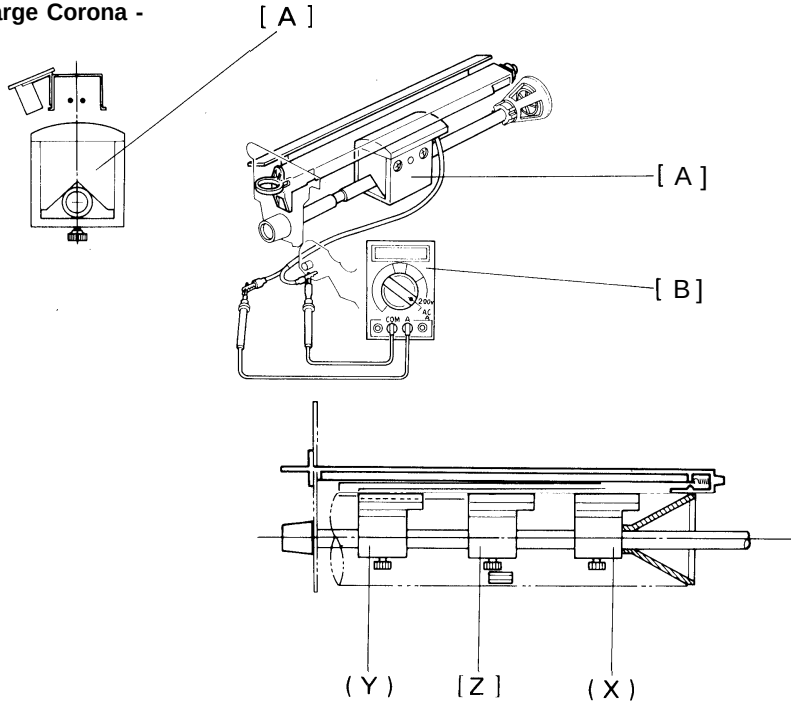
6. Install the drum shoe and adapter on the drum shaft with the lip to the rear.

7. Route the shoe lead wire out through the development unit opening.

8. Connect the drum shoe and the digital multimeter leads as shown on the next page. Positive lead to the red lead clip. Negative lead and the black lead clip to the machine ground.

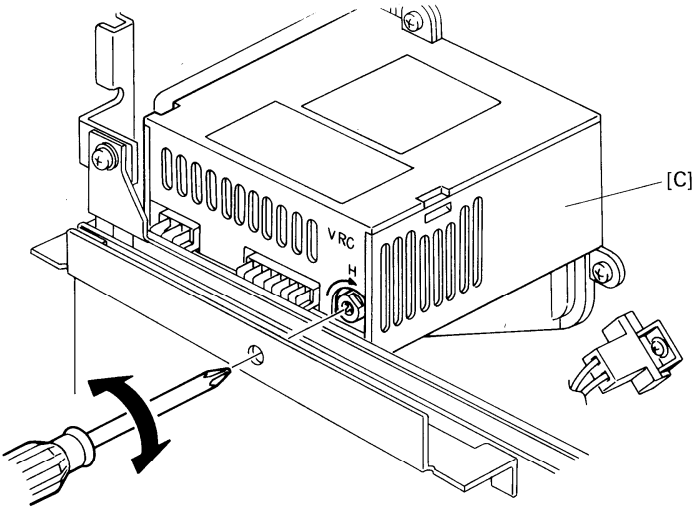
9. Open the Manual Feed table to keep the Start key red even if the machine is warmed up.

- Charge Corona -



OPTIMUM ADJUSTING VALUE: DC +42.9 ± 0.4 μA

1. Slide the drum shoe [A] to its rear limit as shown (X).
2. Position the drum shoe so that the axis of the current sensing plate is aligned with the charge corona wire as shown.
3. Reinstall the drum stay (1 screw and 1 knob) and the charge corona unit.
4. Select the dc 200 μA range of the digital multimeter [B].
5. Turn on the charge corona (C. C.) switch on the switching board.
6. Turn on the main switch and note the reading. (Wait 30 seconds for the current to stabilize.)
7. Turn off the main switch, move the drum shoe to the front as shown (Y), and repeat steps 3 to 5.



8. Adjust the front corona wire height adjusting screw if the two readings differ. The difference between front and rear should not be more than 0.2 mA.

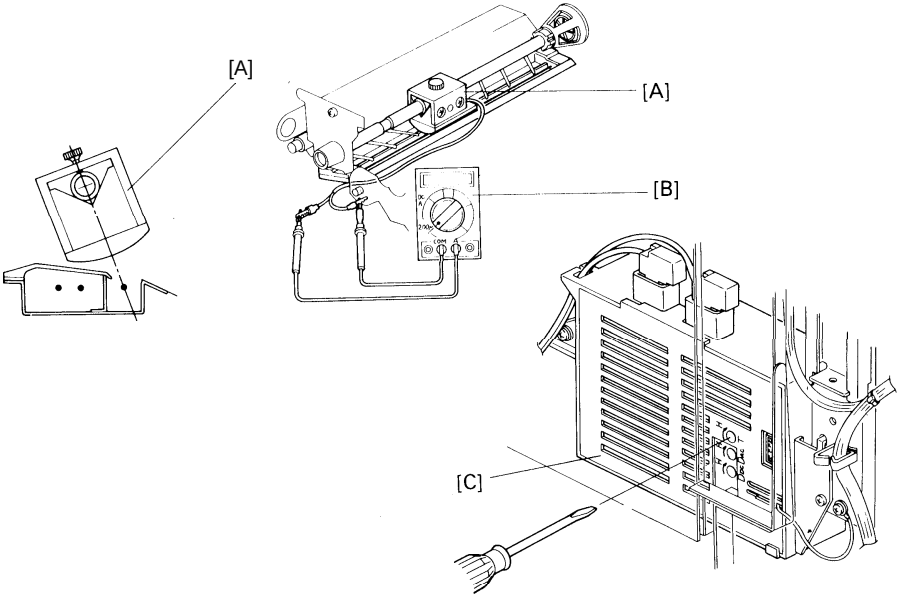
NOTE: - Turn the adjusting screw clockwise to increase the reading.

- Turn it counterclockwise to decrease the reading.

- After adjusting the front side, confirm the rear reading once again.

9. Turn off the main switch and position the drum shoe on the center of the shaft (Z). (The ID sensor is positioned near the the center of the shaft).
10. Turn on the main switch and adjust the charge corona current by turning "VRC" on the C/B power pack [C].
11. Turn off the main switch and the C.C. switch on the switching board.

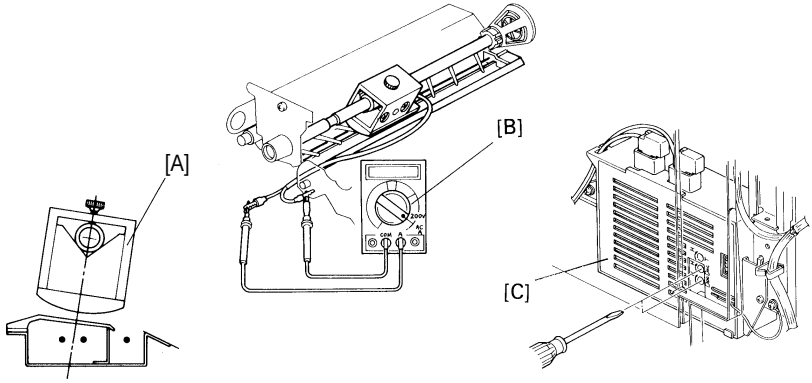
- Transfer Corona -



OPTIMUM ADJUSTING VALUE: DC +19.0 ± 0.4 μA

1. Reinstall the T/S corona unit and position the drum shoe [A] on the center of the shaft so that the axis of the current sensing plate is aligned with the transfer corona wire as shown.
2. Reinstall the cleaning unit and the drum stay (1 screw and 1 knob).
3. Select the dc 200 μA range of the digital multimeter [B].
4. Turn on the transfer corona (T. C.) switch on the switching board.
5. Turn on the main switch and adjust the transfer corona current by turning "T" on the T/S power pack [C]. (Wait 30 seconds for the corona current to stabilize.)
6. Turn off the main switch and the T.C. switch on the switching board.

- Separation Corona



OPTIMUM ADJUSTING VALUE: AC + 38.6 ± 1.4
DC -4.2 ± 0.4

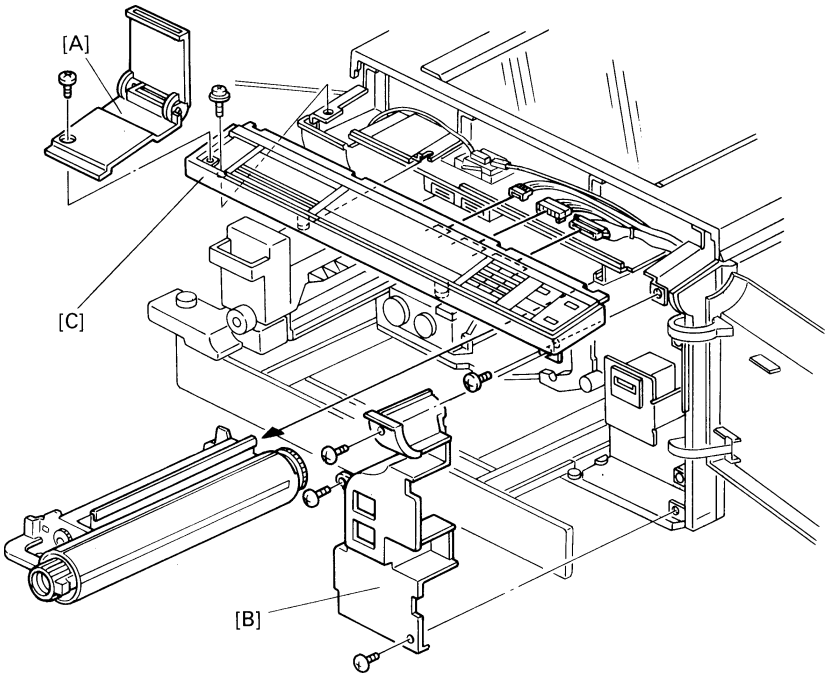
1. Position the drum shoe [A] on the center of the shaft so that the axis of the current sensing plate is aligned between the separation corona wires as shown.
2. Reinstall the drum stay (1 screw and 1 knob) and return the T/S corona unit to its original position.

NOTE: The cleaning unit should also be installed at this time.

3. Turn on the separation corona (D. C.) switch on the switching board,
4. Select the dc **200** μA range of the digital multimeter [B].
5. Turn on the main switch and adjust the separation dc current by turning "DDC" on the T/S power pack [C]. (Wait 30 seconds for the corona current to stabilize.)
6. Turn off the main switch and select the ac 200 μA range of the multimeter.
7. Turn on the main switch and adjust the separation ac current by turning "DAC" on the T/S power pack. (Wait 30 seconds for the corona current to stabilize.)
8. Turn off the main switch.
9. Repeat steps 4 to 8 until both the dc and ac corona currents are within the optimum ranges.
10. Turn off the main switch and the D.C. switch on the switching board

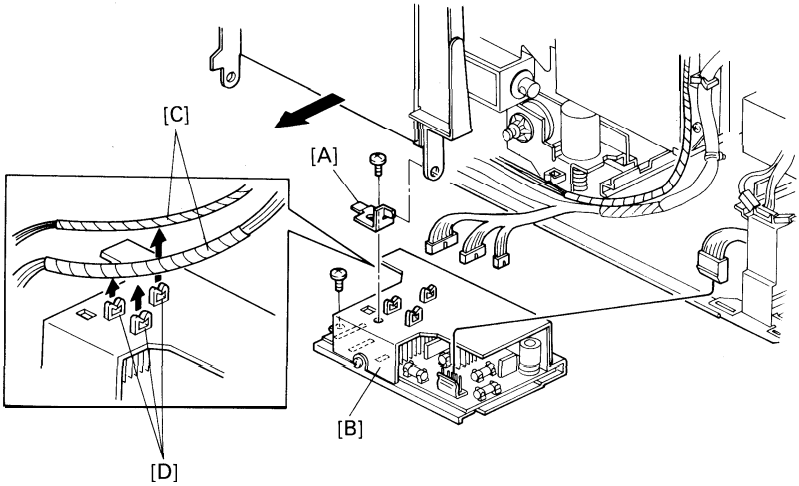
OTHERS

1. Operation Panel Removal



1. Remove the DIP switch cover [A] under the instruction cards (1 screw).
2. Remove the development unit.
3. Remove the right inner cover [B] (3 screws).
4. Remove the operation panel [C] (2 screws and 3 connectors).

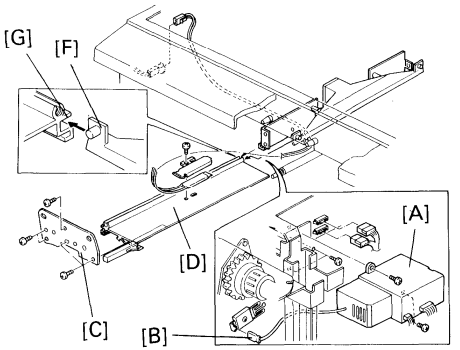
2. **Power Supply Unit Removal**



1. Remove the rear cover (2 screws).
2. Remove the main board plate bracket [A] (1 screw).
3. Remove the power supply unit [B] (1 screw and 4 connectors).

NOTE: When reinstalling the power supply unit, be sure that the wire harnesses [C] are properly placed within their clamps [D].

3. Drum Heater Removal



Turn off the main switch.

Open the front doors and remove the following parts:

- Development unit
- Charge corona unit (1 screw)
- Drum stay (1 screw and 1 knob)
- Erase Lamp
- Toner collection bottle
- Cleaning unit
- Drum flange
- Drum - should be covered with a shielding sleeve
- Drum guide
- T/S corona unit
- Left inner cover (2 screws) and center inner cover (4 screws)

3. Disconnect the lens drive motor connector and the 2nd drive motor connector.
4. Remove the charge corona power pack [A] (1 screws and 1 connector [B]).
5. Remove the front drum support bracket [C] (5 screws).
6. Remove the charge corona unit and erase lamp holder [D] from the rear of the machine (2 screws).
7. Replace the drum heater [E] (1 screw).

NOTE: When installing the drum heater, be sure that the duct outlet [F] is properly positioned in the rail [G] as shown in the figure.

COPY IMAGE

1. Light Intensity Adjustment

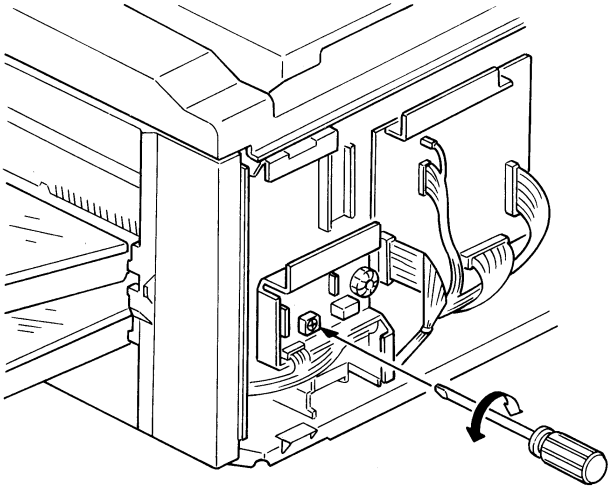
NOTE: - This adjustment should be done when the rest time compensation of the bias voltage is O V. That is, when the main power switch has just been turned on.

- Auto ID sensor adjustment must be done after light intensity adjustment.

ADJUSTMENT STANDARD: Level 2 of the gray scale on the OS-A3 chart should be just visible the copy when the 4th level of the density control is selected.

1. Clean the optics (mirrors, lens, reflectors, exposure glass, toner shield glass), the ID sensor, and the charge corona wire.
2. Turn on the main switch and allow the copier to warm up.

   Set the image density level at the No. 4 position and make 11 test copies of the OS-A3 test chart.
   At this time, it is required to make sure that the auto image density base level is at the No. 4 position. If not, change the base level to No. 4.
4. Confirm that level 2 of the gray scale is just visible on the 11th copy. If the image density is not correct, proceed to steps 5 to 10.



5. Remove the rear cover (2 screws), then turn VR1 on the lamp regulator board to correct the light intensity.

6. Confirm that the image density is within the standard.

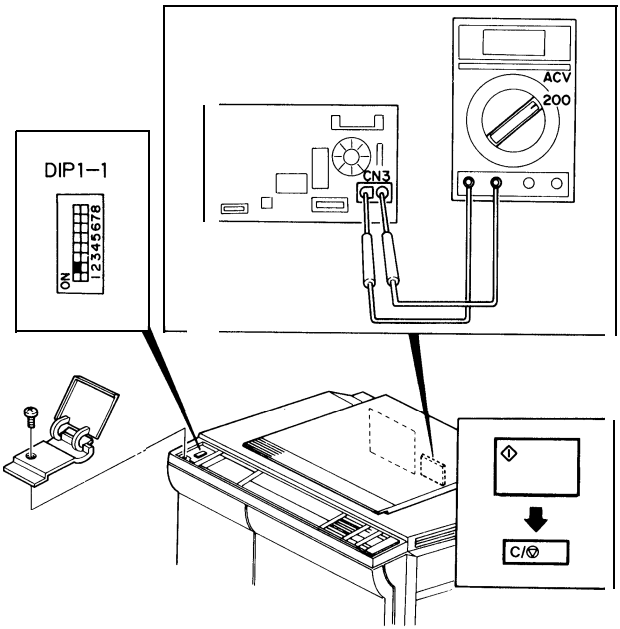
NOTE: - If the test copies are made within 3 minutes after making the previous copies, check the image density on the 4th copy.

- If it is over 3 minutes, check the image density on the 6th copy.

- Check and adjust the light intensity at every visit.

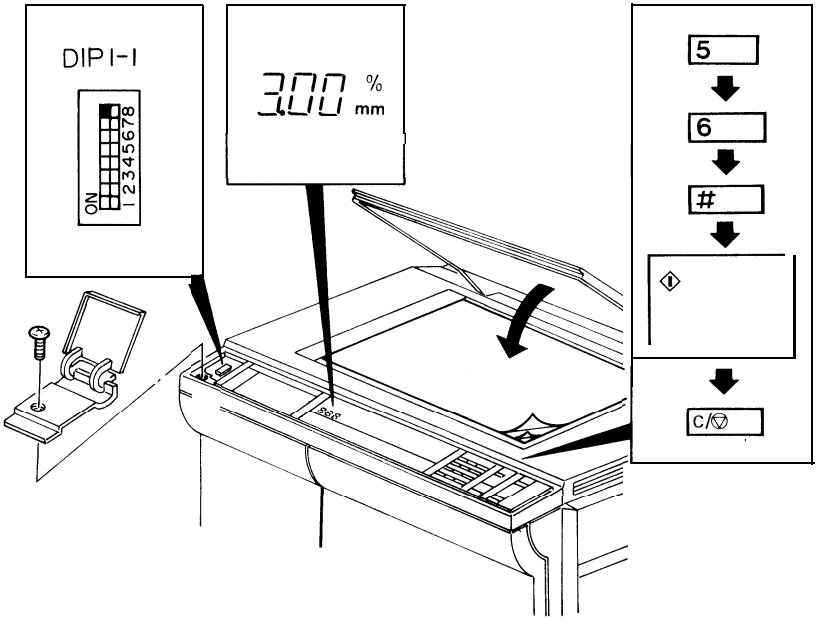
7. Turn off the main switch and reassemble.

2. Exposure Lamp Voltage Check



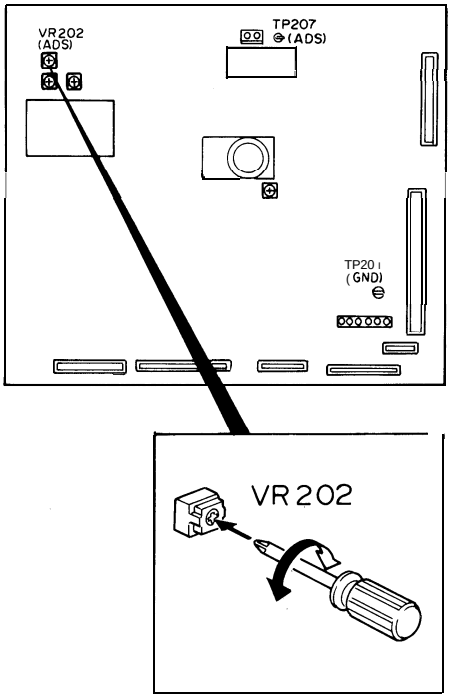
1. Remove the DIP switch cover (1 screw).
2. Turn off the main switch and turn on **DIP** SW 1-2.
3. Remove the rear cover (2 screws), then turn on the main switch.
4. Set the positive and negative leads of the multimeter after selecting AC 200-volt range.
5. Press the Start key for free run.
6. Take the exposure iamp voitage reading with the multimeter.
7. Press the C/S key to stop the copier.

3. **Auto ID Sensor Adjustment**



ADJUSTMENT STANDARD: 3 Vdc ± 0.06 volts

1. Adjust the light intensity before adjusting the Auto ID sensor.
2. Remove the rear cover (2 screws) and the DIP switch cover (1 screw)
3. Turn off the main switch and turn on DIP switch No. 1-8.
4. Turn on the main switch and allow the copier to warm up.

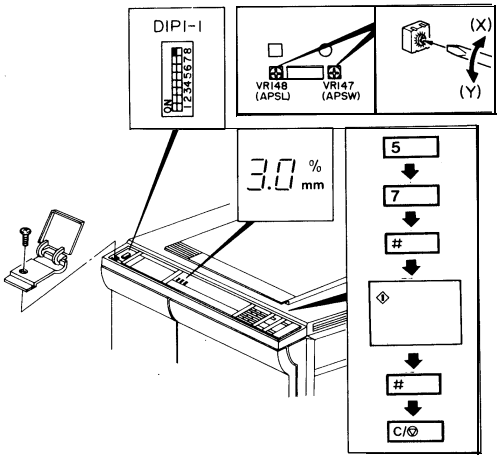


5. Place a few sheets of A3 (11 “xl 7“) paper on the exposure glass.
6. Enter “56” using the numeral keys, then press the Enter key and the Start key.
7. Adjust the Auto ID sensor by turning VR202 on the main board.

NOTE: - Continue the adjustment procedure until the value is within specifications.

8. Press the C/S key to stop the copier
9. Turn off the main switch and DIP switch No. 1-8, then reassemble the covers.

4. Original Width/Length (OW/OL) Sensors Adjustment



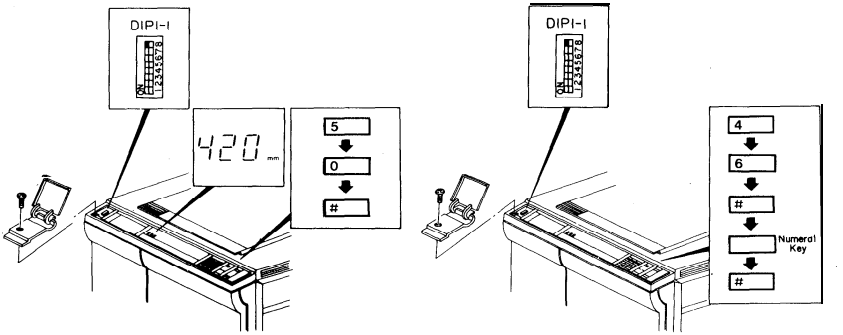
ADJUSTMENT STANDARD: 3 ± 0.1 volts

1. Adjust the light intensity and the Auto ID sensor before adjusting the OW/OL sensors.
2. Remove the rear cover (2 screws) and the DIP switch cover (1 screw).
3. Turn off the main switch and turn on DIP switch 1-8.
4. Place 5 sheets of A3 (11 “xl 7“) paper on the exposure glass.
5. Turn on the main switch and enter “57” using the numeral keys, then press the Enter key.
6. Wait for the copier to warm up, then press the Start key.
7. Refer to the current OW sensor voltage reading displayed on the magnification indicator, and adjust the voltage by turning VR147 on the main board.
8. To display the OL sensor voltage, hold down the Enter key. Adjust the OL sensor voltage by turning VR148 on the main board.

NOTE: **-** Turn clockwise to increase the voltage.
- Turn counterclockwise to decrease the voltage.

9. Press the C/S key to turn off the main motor and stop scanning.
10. Turn off the main switch and DIP switch 1-8, and reassemble the covers.

5. Length Sensing Adjustment



1. Remove the DIP switch cover (1 screw).
2. Turn off the main switch and turn on DIP switch 1-8.
3. Place a sheet of A3 (LDG) paper on the exposure glass and align it to the left scale.
4. Enter “50” using the numeral keys, then press the Enter key.

NOTE: The copier then performs one free run to detect the paper length, which is then displayed on the magnification indicator.

5. If the detected length is not 420 (432/LDG), subtract the number displayed on the indicator from 420 (432/LDG).

6. Correct the adjusted length in data in the SP Mode #46. The procedure for doing so is as follows:

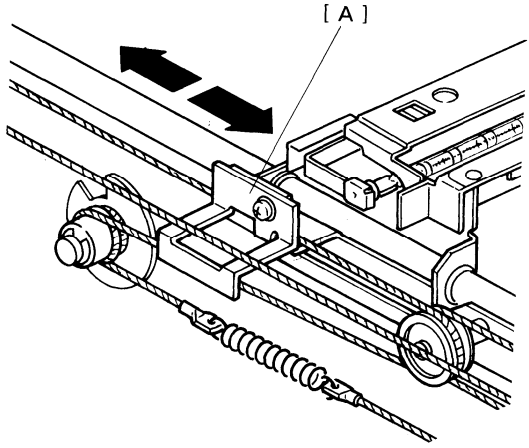
   (1) Enter “46” using the numeral keys, then press the Enter key.

   (2) Check the copy counter, where a number from O to 15 will be displayed. (SP Mode #46 enables 16 correction steps, 1 mm per step). If, for example, the detected length is 418 and “8” is displayed on the copy counter, enter “1 O“ (The difference between 8 and 10 is 2, as is the difference between 418 and 420) using the numeral keys and press the Enter key. Then repeat steps 1-4 to verify that the correct length is detected.

7. Confirm that the length has been corrected by repeating steps 1 to **4.**

8. Turn off the main switch and DIP switch 1-8, and then reassemble the cover.

6. Horizontal Magnification Adjustment



ADJUSTMENT STANDARD: ± 0.5% (Full Size)

- Method A: Using the wire clamp

1. Remove the rear cover (2 screws).
2. Remove the two mounting studs and eight screws securing the upper cover.
3. Lift the back edge of the upper cover and loosen the wire clamp [A] (1 screw).
4. Move the clamp to the right to enlarge the copy image. Move it to the left to reduce the copy image. (Viewed from the rear side.)

- Method B: Using SP Mode 44, which can adjust the position of the 2nd scanner by turning the drive pulley cam [B].

1. Make sure that the main switch is off and turn on DIP switch No. 1-8 on the operation panel.
2. Enter “44” using the numeral keys, then press the Enter key.
3. Change the data according to the SP Mode Table when making a copy. Adjust the horizontal magnification when changing the data of SP Mode # 44.

7. Vertical Magnification Adjustment

ADJUSTMENT STANDARD: ± 1%

Adjust the vertical component of magnification (scanner forward velocity) using SP mode # 43.

8. **Lead Edge Registration Adjustment**

ADJUSTMENT STANDARD: O ± 2 mm (O ± 0.08")

1. Place a 150 mm scale on the exposure glass, aligning it with the left scale.
2. Make 3 copies with the ID level at the No. 7 position.
3. Adjust the lead edge registration using SP mode # **42.**

9. Lead Edge Erase Margin Adjustment

NOTE: This adjustment should be made after Lead Edge Registration Adjustment.

ADJUSTMENT STANDARD: 3.5 ± 2.5 mm (0.14" ± 0.1")

Adjust the lead edge erase margin using SP Mode # 41.

SECTION 6

ELECTRICAL DATA

CONTENTS

ELECTRICALDATA 6-1

MAIN BOARD SCHEMATIC (Main Control)

MAIN BOARD SCHEMATIC (Optics Control)

OPERATION PANEL BOARD SCHEMATIC

PAPER FEED CONTROL BOARD SCHEMATIC

DC POWERSUPPLY BOARD SCHEMATIC

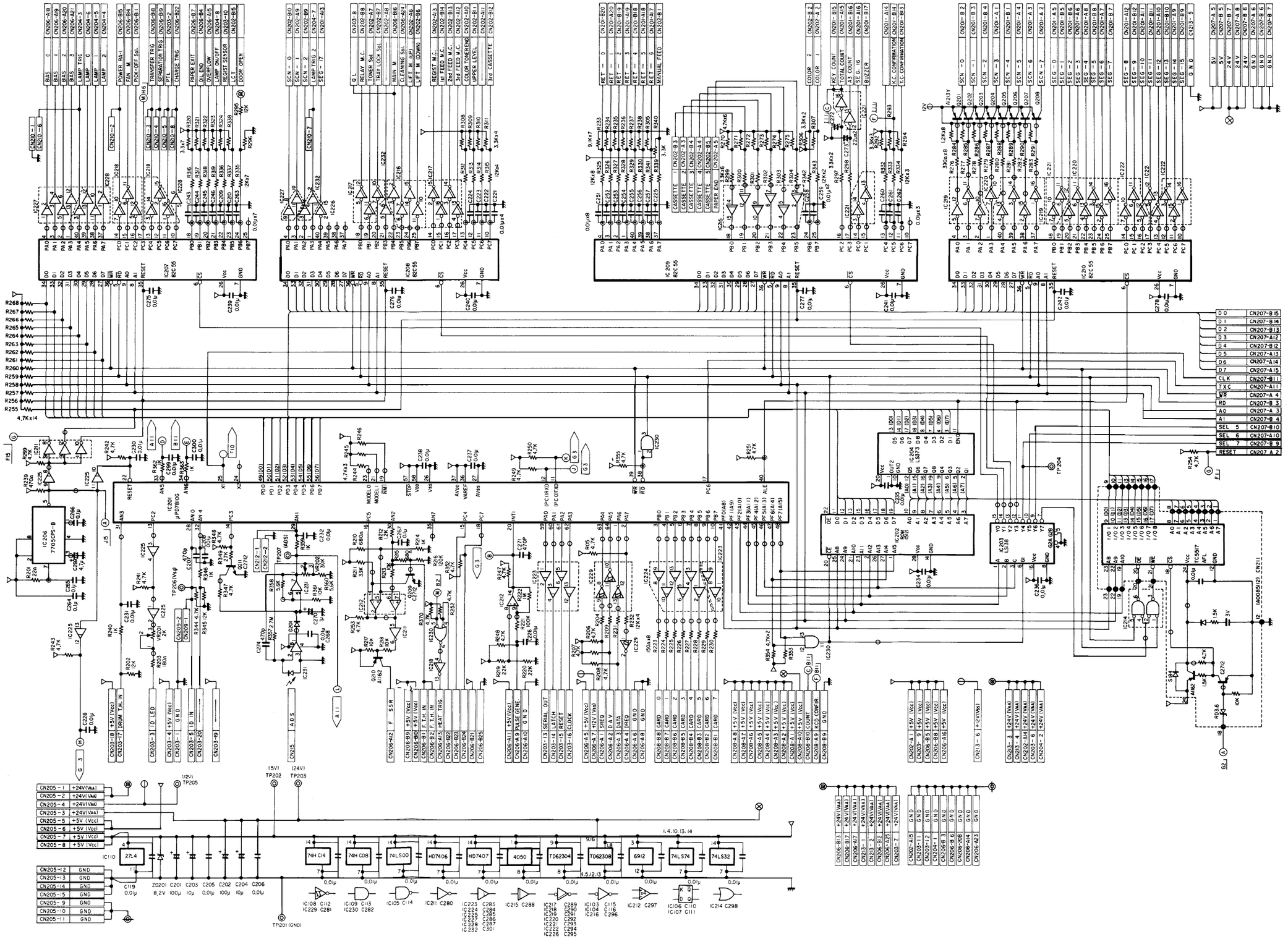
LAMP REGULATOR BOARD SCHEMATIC

FUSING LAMP DRIVE BOARD SCHEMATIC

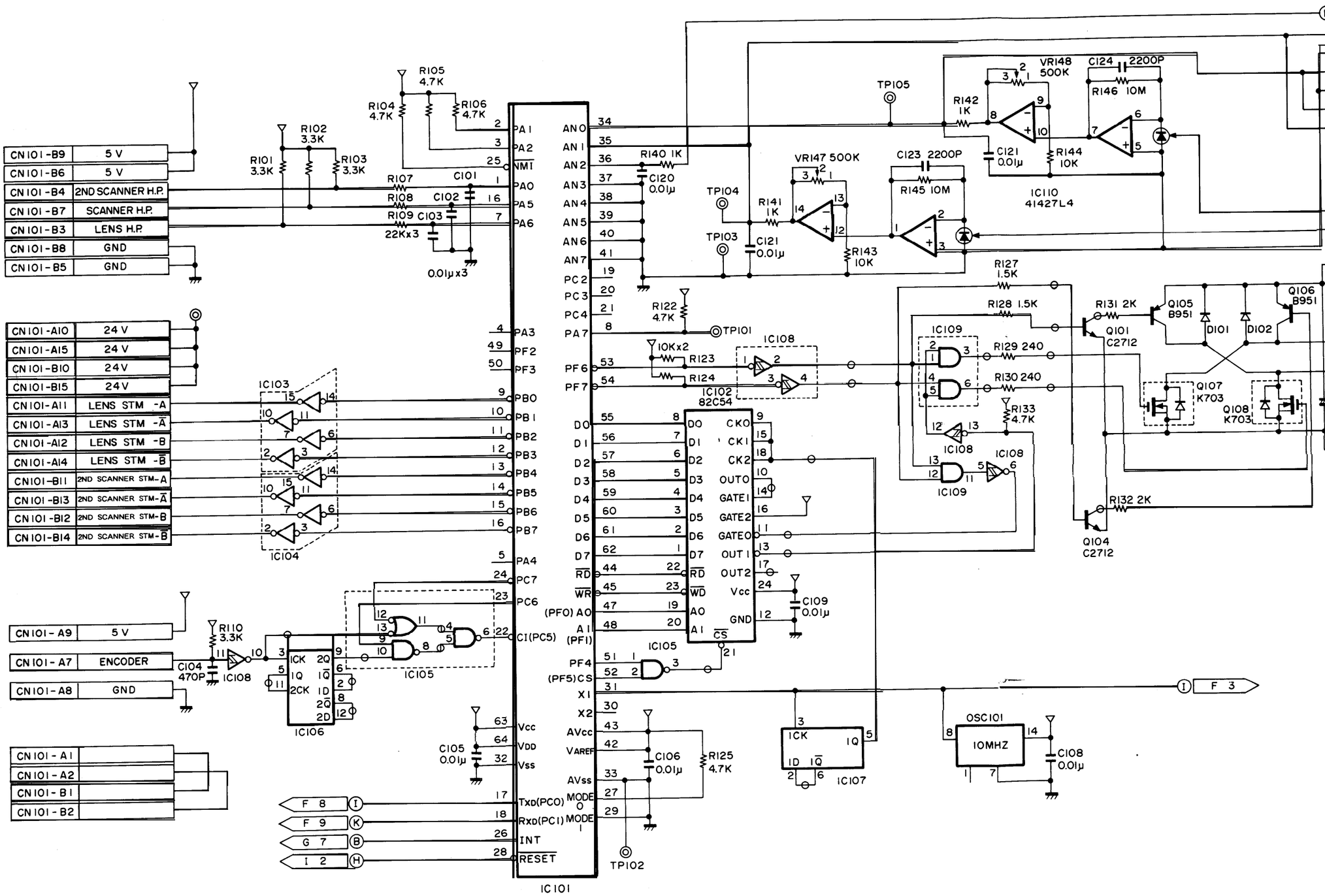
INTERFACE BOARD SCHEMATIC (TYPE-E)

TIMING CHART (Main Frame)

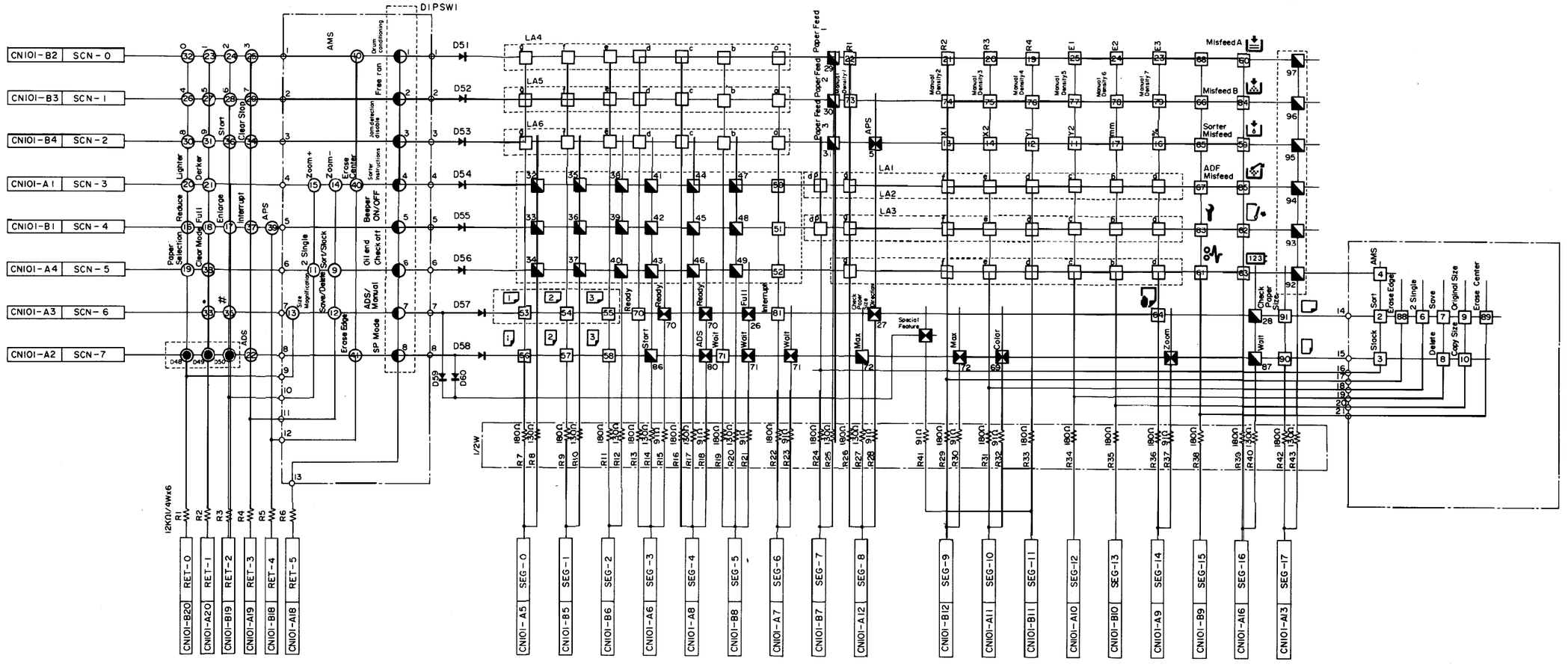
MAIN BOARD SCHEMATIC (Main Control)

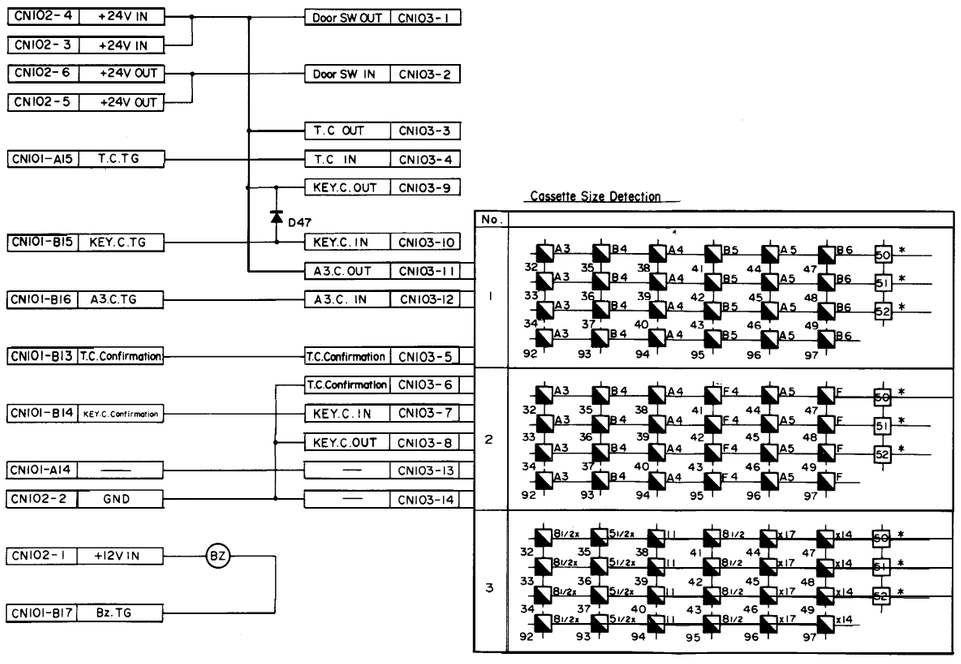


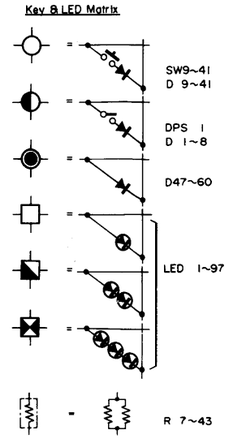
MAIN BOARD SCHEMATIC (Optics Control)

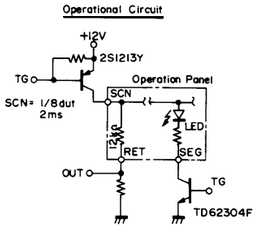


OPERATION PANEL BOARD SCHEMATIC

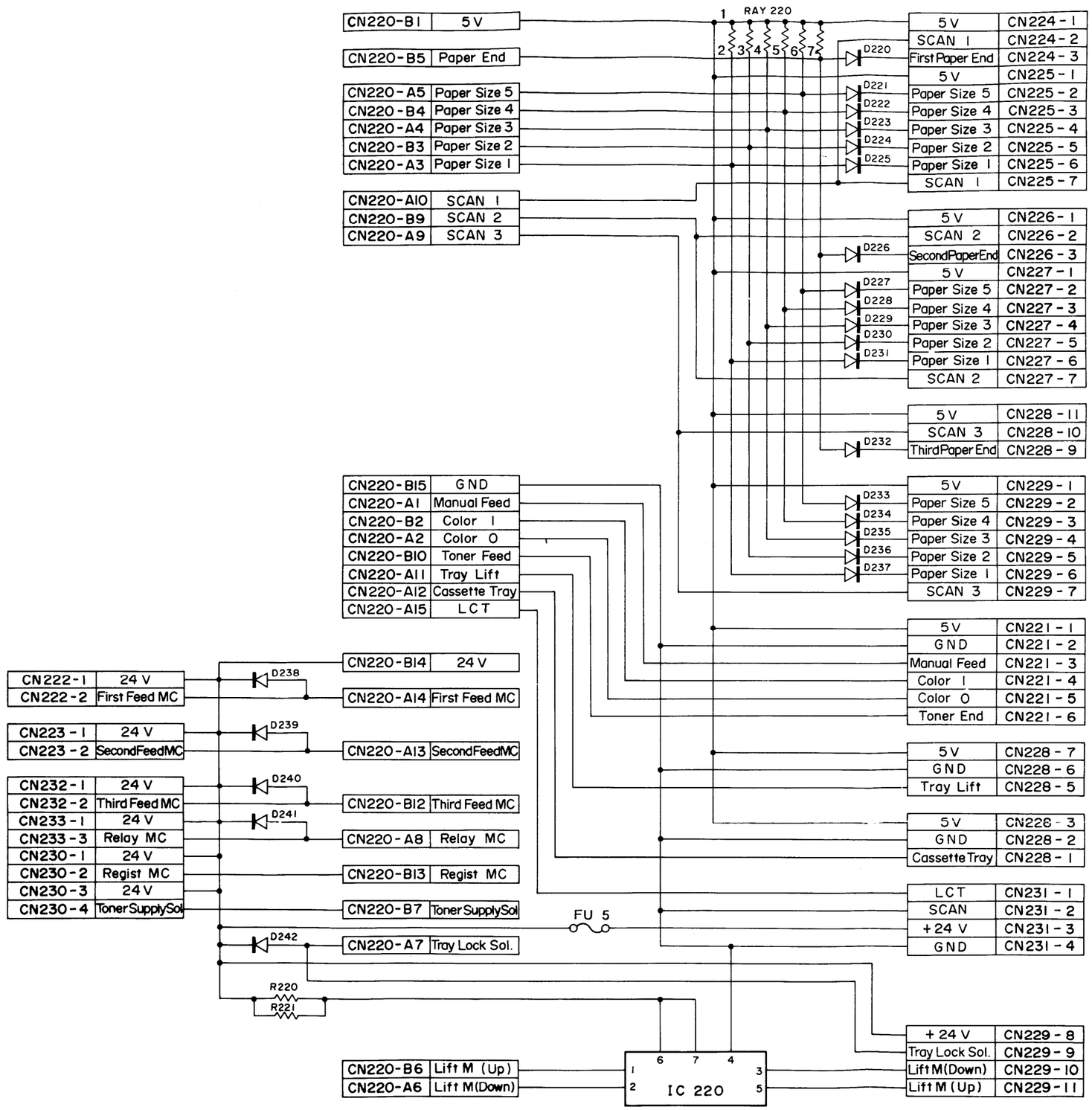




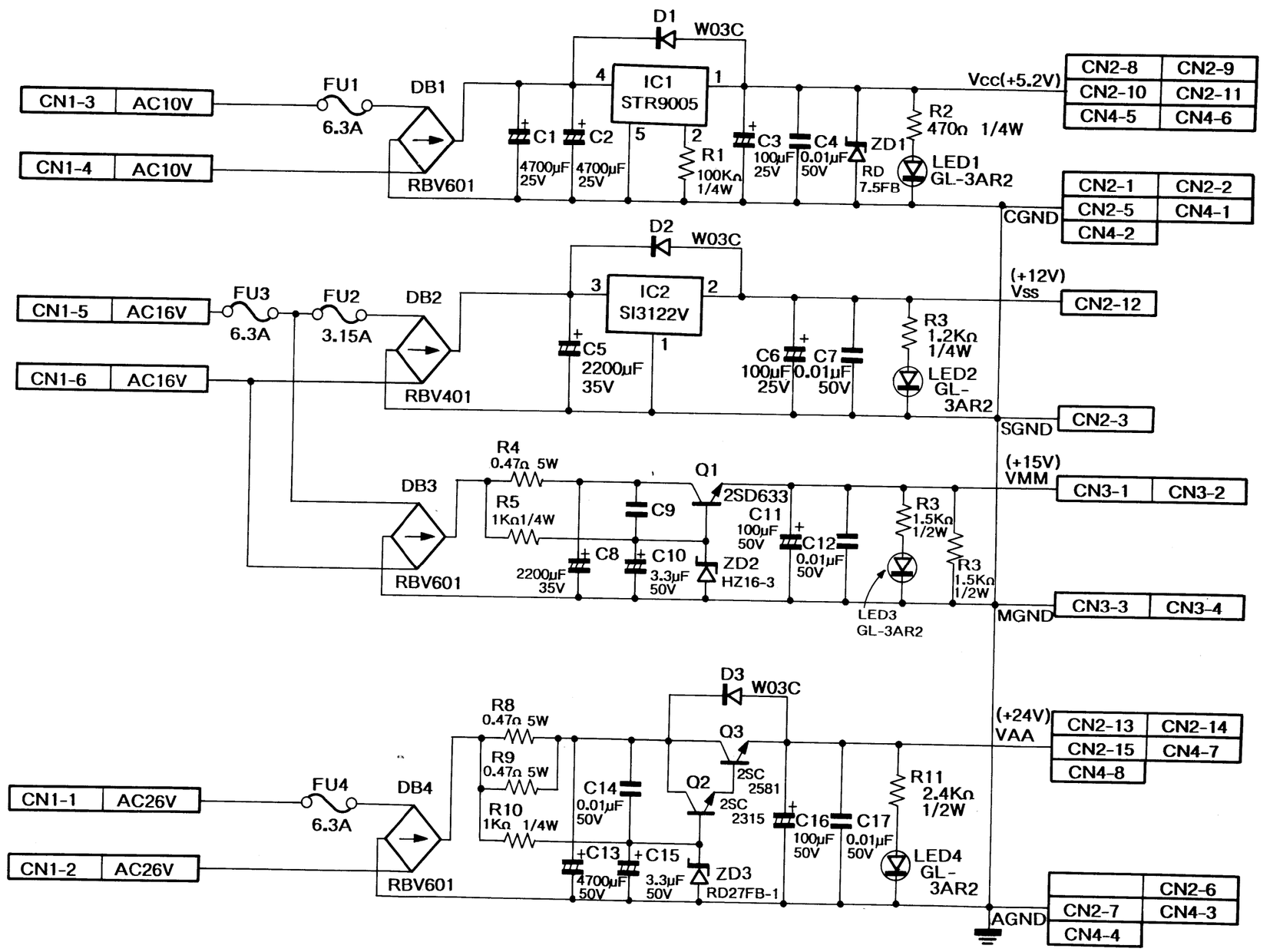




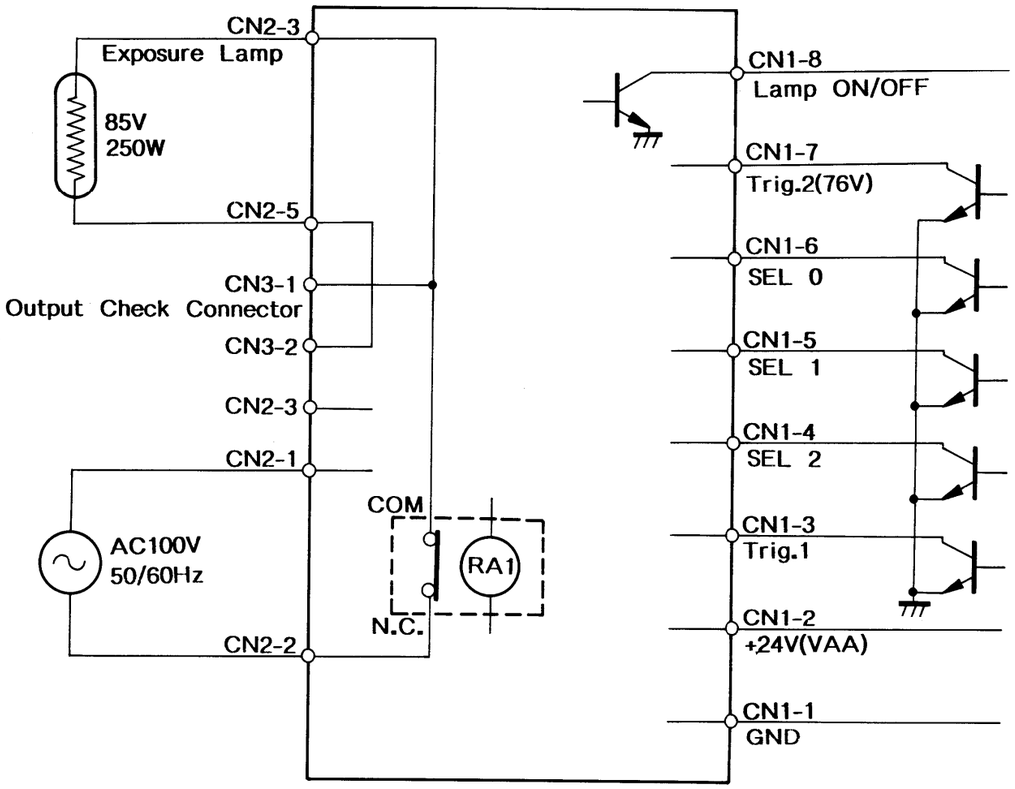
PAPER FEED CONTROL BOARD SCHEMATIC



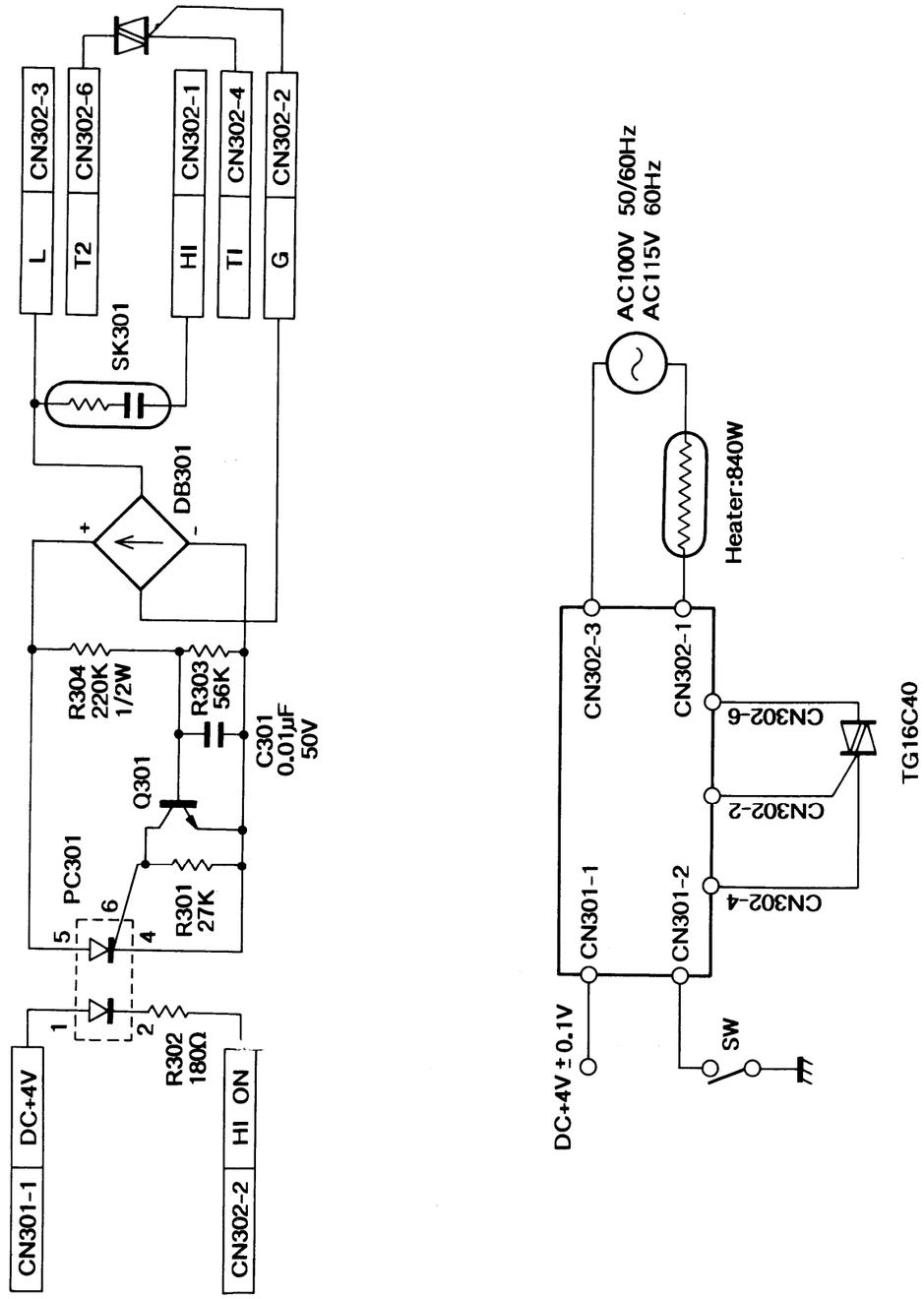
DC POWER SUPPLY BOARD SCHEMATIC



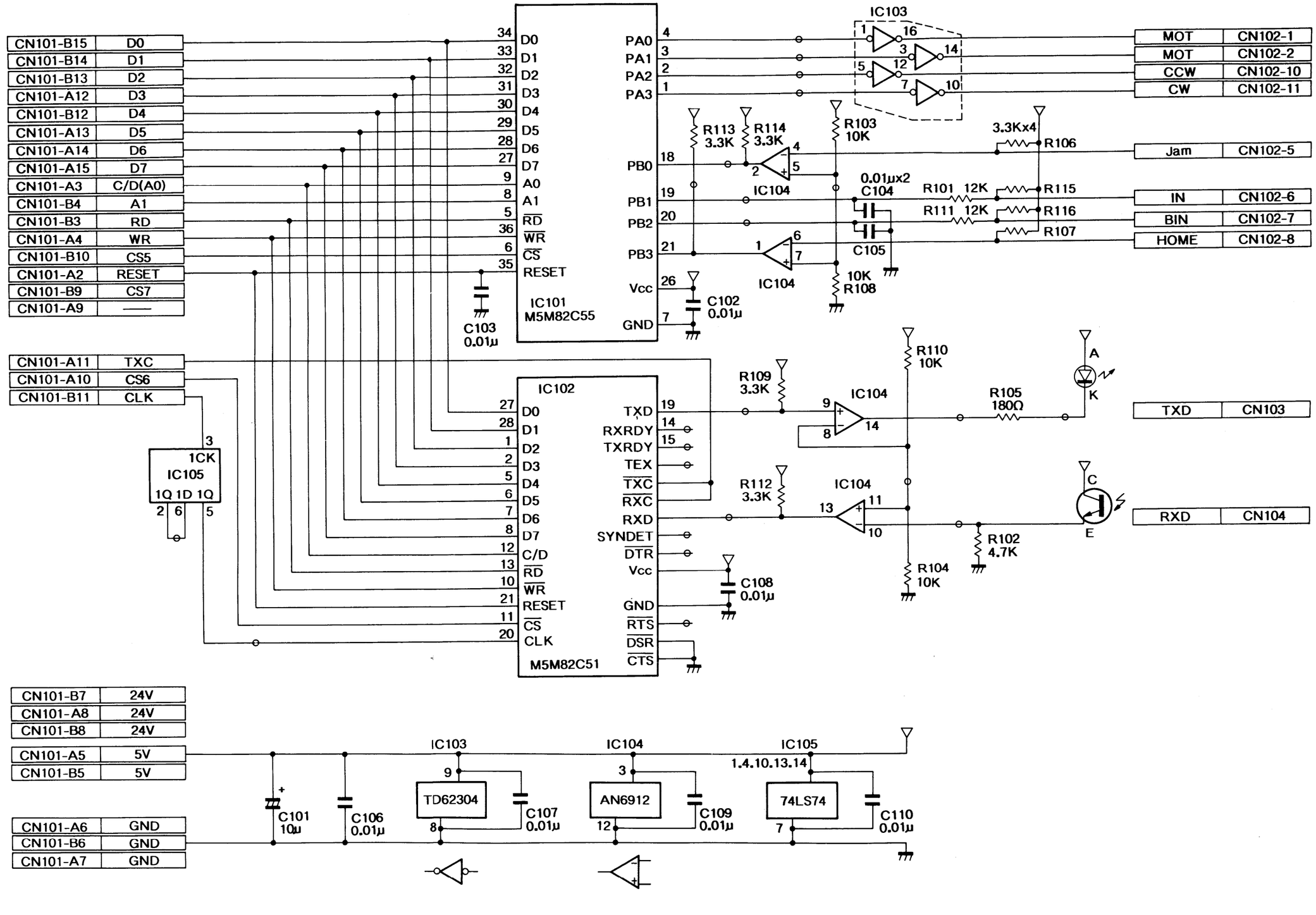
LAMP REGULATOR BOARD SCHEMATIC



FUSING LAMP DRIVE BOARD SCHEMATIC

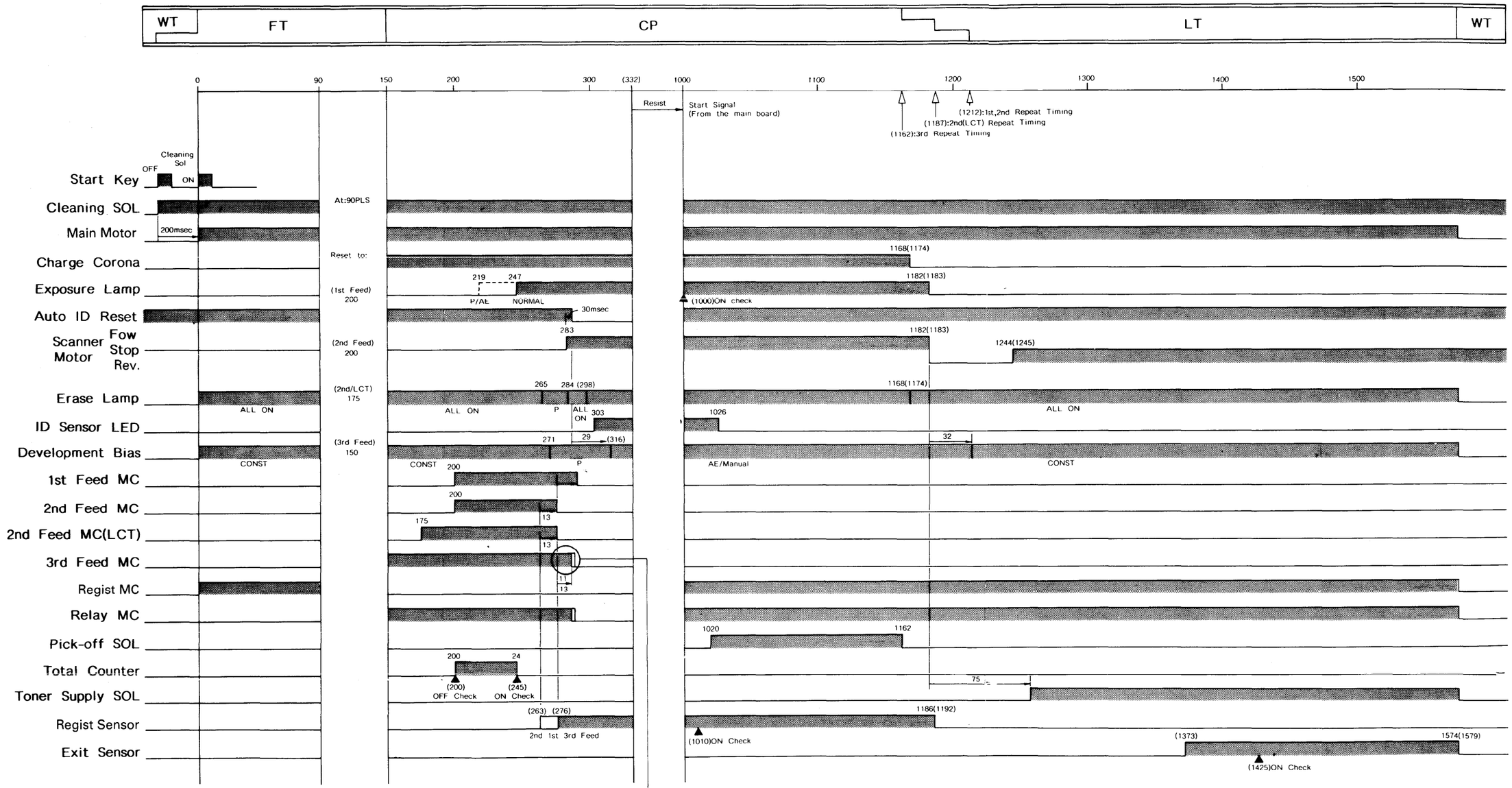


INTERFACE BOARD SCHEMATIC (TYPE-E)



A032

TIMING CHART (Main Frame)



OFF timing of 3rd Feed Clutch depends
on the paper size
11 pulses:B5(S),A5(S),B6(S),B6(L)
13 pulses:other paper size

A4 SIDEWISE SINGLE COPYING
1 PLS = 6.98ms
= 1.047mm

LT:( )

SECTION 7

DOCUMENT FEEDER

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DF MAIN BOARD SCHEMATIC

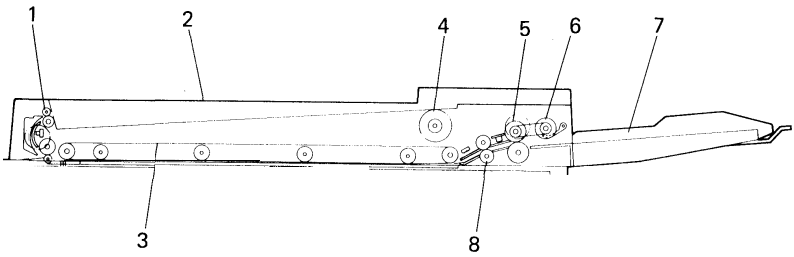
DF TIMING CHART

DOCUMENT FEEDER

SPECIFICATIONS

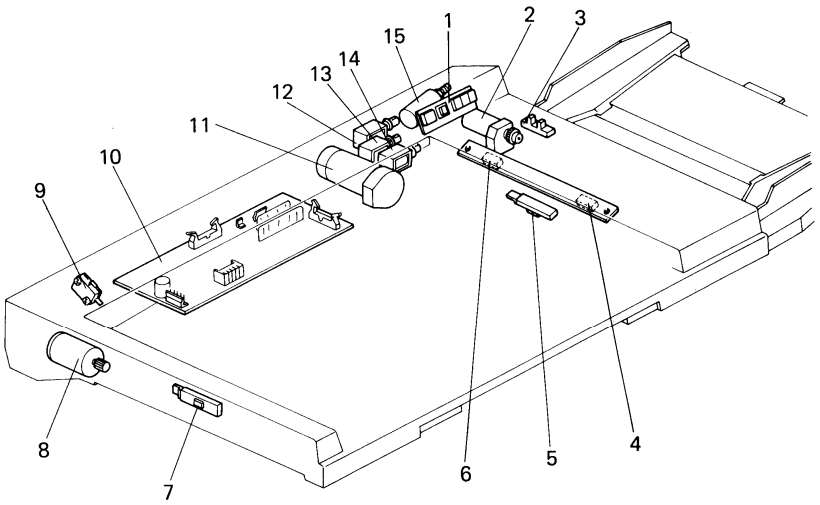
Original Size:	ADF mode Maximum A3 (11" x 17") Minimum A5 (5 1/2" x 8 1/2") SADF mode Maximum A3 (11" x 17") Minimum B6 (5 1/2" x 8 1/2") lengthwise
Weight:	Maximum 130 g/m^2 (34 lb) Minimum 40 g/m^2 (11 lb)
Original Feed Modes:	Automatic Feed (ADF mode) Manual Feed one by one (SADF mode)
Original Capacity:	Maximum 50 sheets (80 g/m^2, 20 lb)
Original Separation:	FFR system
Original Transportation:	Flat belt
Original Stop System:	DC servomotor control system
Original Feed Speed:	15 cpm / ADF mode
Power Source:	DC 24V / 5V (from copier)
Power Consumption:	20 w
Dimensions: (W XDXH)	935mmx515mmx95mm 36.8" **X** 20.3" **X** 3.8"
Weight:	11.5 kg (25.3 lb)
Copier Interface Equipment:	Interface PCB type E

MECHANICAL COMPONENT LAYOUT



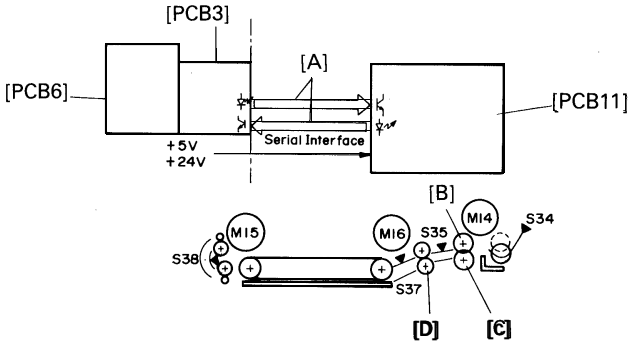
1. Exit Roller
2. DF Cover
3. Drive Belt
4. Drive Pulley
5. Feed Roller
6. Pick-up Roller
7. Original Table
8. Registration Rollers

ELECTRICAL COMPONENT LAYOUT



1. Indicator PCB (PCB-10)
2. Feed-in Motor (M-14)
3. Feed-in Sensor (S-34)
4. Entrance Sensor (S-35)
5. Registration Sensor (S-37)
6. Width Sensor (S-36)
7. Exit Sensor (S-38)
8. Feed-out Motor (M-15)
9. Lift Switch (SW-1 O)
10. DF Main PCB (PCB-11)
11. Belt Drive Motor (M-16)
12. Pick-up Solenoid (Sol-7)
13. Registration Solenoid (Sol-8)
14. Roller Release Solenoid (Sol-9)
15. Stopper Solenoid (Sol-10)

BASIC OPERATION



The DF has its own CPU which controls all of the DF functions. The DF CPU communicates with the copier through an interface board [PCB 3] and serial interface bus. Fiber optics [A] are used for the serial interface bus because they are unaffected by electrical noise.

When an original is set on the original table, the original sensor [S34] is activated. The DF CPU then selects either the ADF or SADF mode depending on the number of originals set. If one original is set, SADF is selected. If more than one original is set at the same time, SADF changes to ADF when the second original starts to feed.

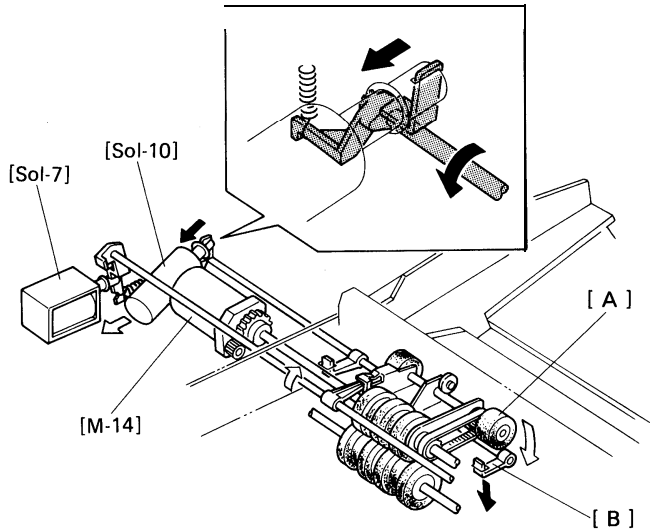
The DF CPU energizes the stopper and pick-up solenoids, and then turns on the feed-in motor [M 14]. The feed [B] and friction rollers [C] separate and feed an original to the registration rollers [D].

A short time after the original reaches the registration roller the DF CPU turns on the belt drive motor [Ml 6] and energizes the registration solenoid. The time lag enables the original skew to be corrected. The belt then feeds the original to the exposure glass, while the CPU counts the pulses of the M16 encoder. At the proper time, the CPU turns off M 16.

When the DF CPU receives the feed-out signal from the copier, it turns on the feed-out motor [M 15] until the exit sensor [S38] is deactuated by the trailing edge of the original.

As the exit sensor is inside the exit unit, the trailing edge of the original is still in the exit unit. After 0.4 second, the CPU turns on Ml 5 to feed the original out completely. This stacks the originals tidily.

FEED-IN UNIT MECHANISM

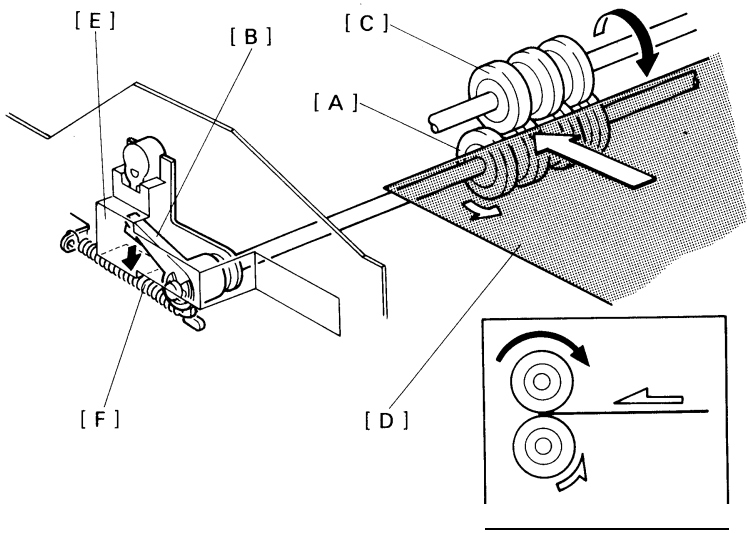


After an original is inserted into the feed-in unit and the Start key is pressed, the DF CPU energizes the pick-up solenoid [S01-7] and the pick-up roller [A] drops onto the top of the original(s). At the same time, the DF CPU energizes the original stopper solenoid [Sol-1 O] to retract the stopper claws [B].

In ADF mode, the original stopper claws stay underneath the original feed table until all the originals have been fed. In SADF mode, the stopper claws rise up for each original.

200 ms after energizing the solenoids, the DF CPU turns on the feed-in motor [M-14] which rotates the feed and pick-up rollers.

MISFEED PREVENTION

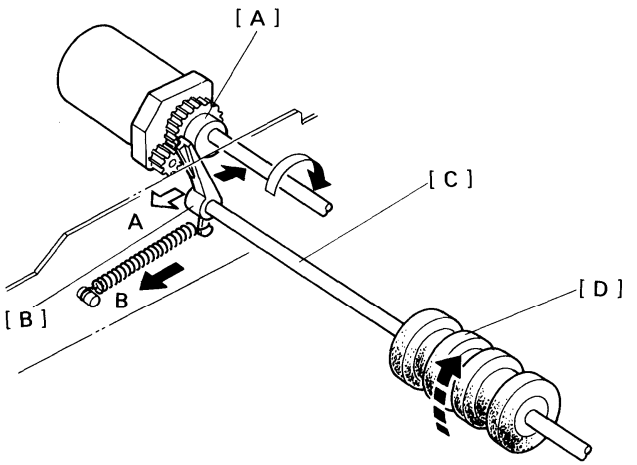


The front side of the friction roller [A] is attached to the misfeed prevention lever [B] through a one-way clutch.

When the leading edge of an original first contacts the feed [C] and friction rollers [A], the friction roller is stationary. As the leading edge is fed between these rollers, the friction roller rotates counter clockwise a few degrees to help feed thick originals [D]. After the friction roller has rotated a few degrees, the misfeed prevention lever contacts the stopper plate [E] and the friction roller stops rotating. At this point, the separation mechanism will eliminate multiple feeding.

When the trailing edge of the original passes the friction roller, the spring [F] returns the lever to its original position without rotating the friction roller shaft.

WEAR PREVENTION

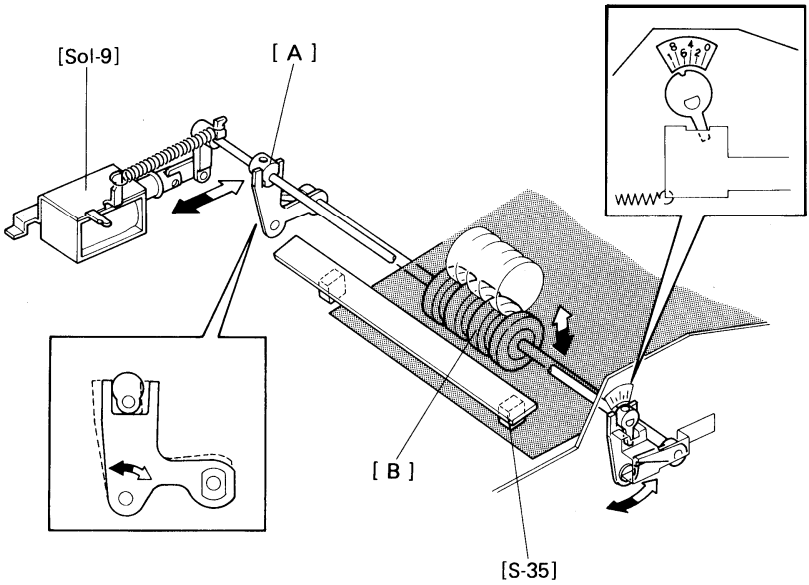


The rear side of the feed roller shaft drive gear has an eccentric cam [A]. This cam contacts the wear prevention lever [B] which is attached via a one-way clutch to the friction roller shaft [C]. This lever is free to rotate in the direction of the white arrow A.

As the feed roller drive gear rotates, the high point of the cam pushes back the wear prevention lever in the A direction. As the cam rotates to the low point, a spring returns the wear prevention lever to its original position (black arrow B). When the wear prevention lever returns, it rotates the friction roller shaft, through the one-way clutch.

Every time the feed roller shaft rotates once, the friction roller shaft is rotated a few degrees. This prevents the friction roller [D] from wearing unevenly or too quickly.

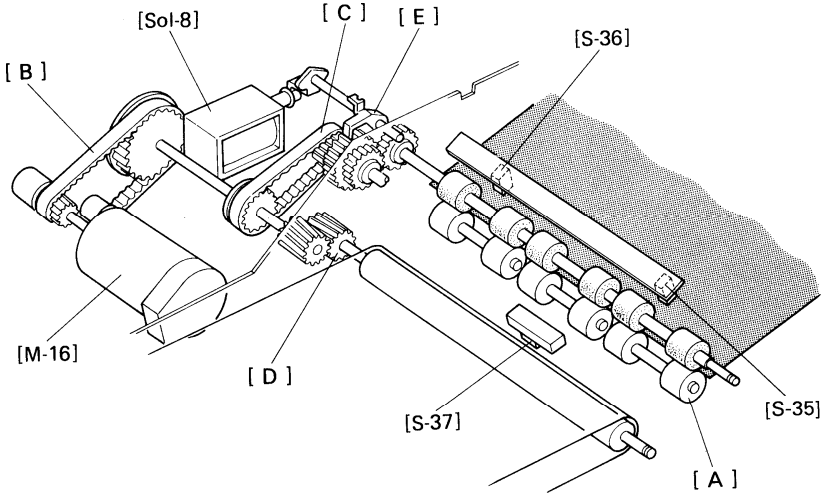
FRICTION ROLLER RELEASE MECHANISM



In the ADF mode, when the original activates the original entrance sensor [S-35], the DF CPU energizes the roller release solenoid [Sol-9], This action rotates the roller release cam shaft, which has an eccentric cam [A] on each end, to decrease the overlap of the feed and friction rollers. This is to prevent the original from being smeared by the friction roller [B]. The overlap is 0.9 mm when the solenoid is off, and 0.4 mm when it is on.

In the SADF mode, it is not necessary to separate the originals, so the DF CPU energizes the roller release solenoid and releases the friction roller before feeding the original.

REGISTRATION



The DF CPU stops the feed-in motor [M 14] 30 milliseconds after the leading edge of the original activates the original entrance sensor [S-35]. The original's own forward momentum, which causes the original to align against the registration roller [A], corrects the skew.

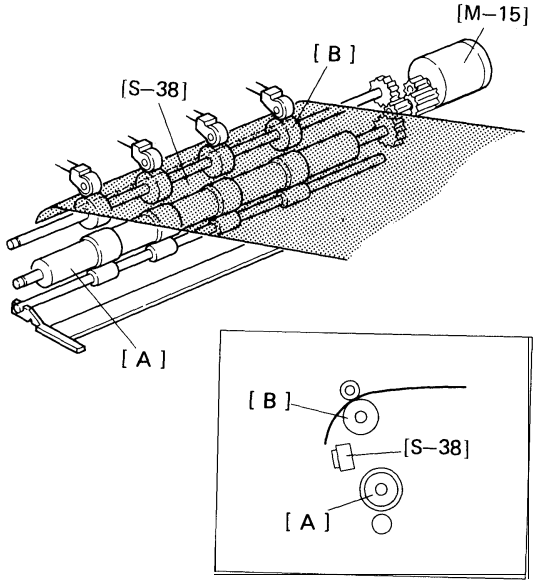
After a further 30 milliseconds, the DF CPU energizes the belt drive motor [M-16] and the registration solenoid [Sol-8]. Rotation of the belt drive motor is transmitted to the feed belt and registration rollers via the timing belts [B and C], belt drive gear [D], registration clutch [E], and registration roller gear.

The DF CPU starts counting the pulses from MI 6 when the leading edge of the original activates the registration sensor [S-37]. When the pulse count reaches 1,962 pulses (about 940 ins), the original is at the proper position, and the DF CPU stops M16.

In Auto Paper Selection or Auto R/E mode, the ADF automatically determines the original size. The registration sensor and the original width sensor [S-36] measure the original size. The registration sensor measures the length of the original by counting the MI 6 pulses as the original passes under it. Then, if the original size cannot be determined from the length alone, the CPU checks whether the original has actuated the original width sensor. Based on the input from these two sensors, the correct original size can be determined.

The registration sensor is also a jam detector.

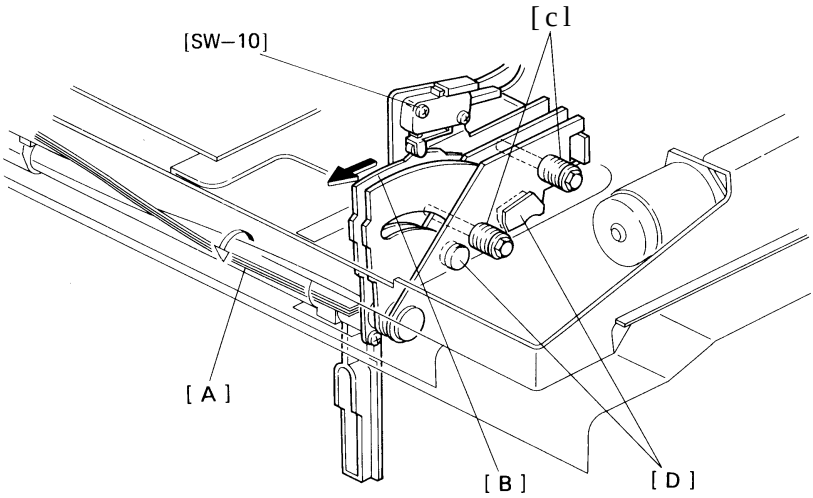
FEED-OUT MECHANISM



When the DF CPU receives the feed-out signal, it energizes the belt feed-out motors. The feed-out motor [M- 15] drives both the lower [A] and the upper exit roller [B] through an idle gear, drive and exit roller

When the exit sensor [S-38] detects the trailing edge of the original, the CPU reduces the speed of the feed-out motor to feed the original out completely. This is done to stack the originals neatly.

LIFTING MECHANISM

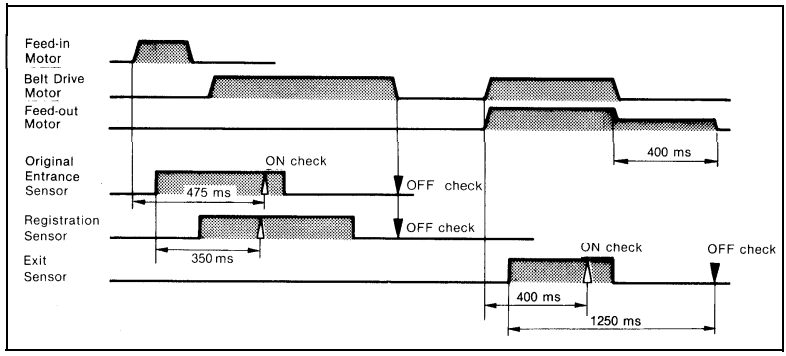


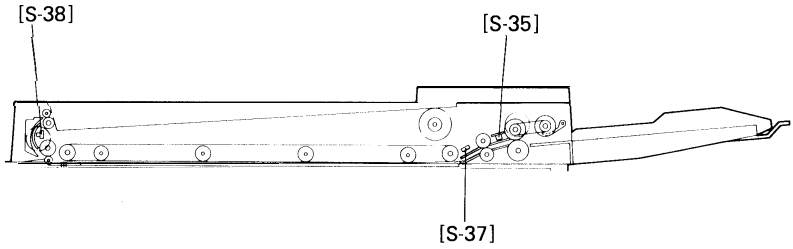
The torsion spring [A] is installed inside the torsion spring collars. A screw fixes the center of the torsion spring, and both sides of the spring are twisted when the belt unit is lowered. The spring tension makes it easier to lift up the belt unit.

The cam plates [B] are sandwiched between the brake shoes [C], which are under pressure from the brake shoe springs [D]. This causes friction between the cam plate and the brake shoes.

When the belt unit is lifted up, the lift switch [SW-IO] is turned on by the detent arm as it moves along the cam plate. When the lift switch is turned on, DF modes are prohibited. At the same time, the DF CPU sends a signal to the copier CPU. This signal enables the copier to operate without the document feeder.

MISFEED CHECK





Three sensors are used for misfeed checks: the entrance sensor [S-35], registration sensor [S-37], and exit sensor [S-38]. After the feed-in motor [M-14] is energized, the original activates the entrance sensor. The DF CPU checks to see if the entrance sensor has been activated (entrance sensor ON check) 475 ms after the feed-in motor has been energized. Then, 350 ms after the entrance sensor is activated, the DF CPU checks to see if the registration sensor has been activated (registration sensor ON check).

The OFF check is carried out when the belt drive motor [M-16] is de-energized. The DF CPU checks to see if the registration sensor has been deactivated (registration sensor OFF check), and if the entrance sensor has been deactivated (entrance sensor OFF check).

The ON check for the exit sensor occurs 400 ms after the feed-out and belt drive motors are re-energized. The OFF check for the exit sensor is done 1,250 ms after the exit sensor is activated. When a misfeed is detected, the DF CPU stops the DF and sends a misfeed signal to the copier. The lift switch cancels a misfeed condition.

DOCUMENT FEEDER INSTALLATION

1. Accessory Check

Check the quantity and condition of the accessories in the box according to the following list:

1. Installation Procedure (115V - English only/220V - five languages)	1
2. New Equipment Condition Report	1
3. Envelope - NECR(115V only)	1
4. Original Exit Guide	1
5. Flip Scale	1
6. Flip Scale spring	1
7. Flathead Shoulder Screw	2
8. Original Feed Table	1
9. Original Table Cover	1
10. DF Interface Harness	1
11. Nylon Harness Bushing	1
12. Test Chart A4	1
13. Flathead Screw - M4 x 6	2
14. Ground Screw	2
15. Toothed Washer	2
16. Pan Head Screw - M4 x 6	4
17. Pan Head Screw with Washer - M4 x 6	2
18. Pan Head Screw - M5 x 12	4
19. Multilingual Decals (220/240V only)	1 set
20. Ty-wrap	1

Interface PCB type E is also required to install the OF.

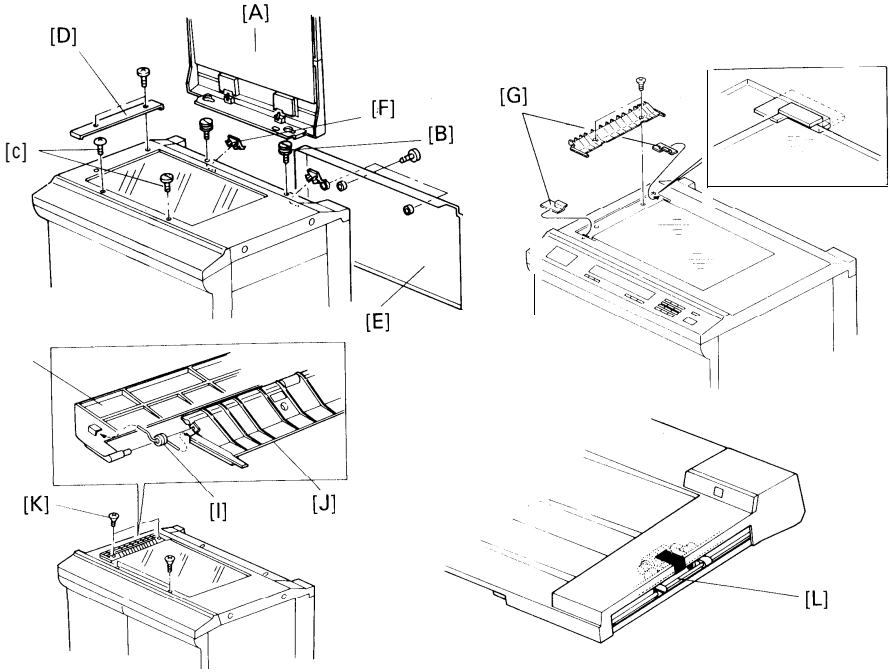
Check the accessories according to the following list.

Interface PCB Type E box:

1. PCB Mounting Stud	2

NOTE: - This is not necessary if a sorter is already installed in the machine.

2. **Installation Procedure**



1 Turn off the main switch and unplug the power supply cord of the copier.

2. Remove the following parts:
   A) Platen cover
   B) Mounting stud (2 pcs)
   C) Truss screw
   D) Left scale (2 screws)
   E) Rear cover (3 screws)
   F) ADF docking hole cap (2 **PCS)**

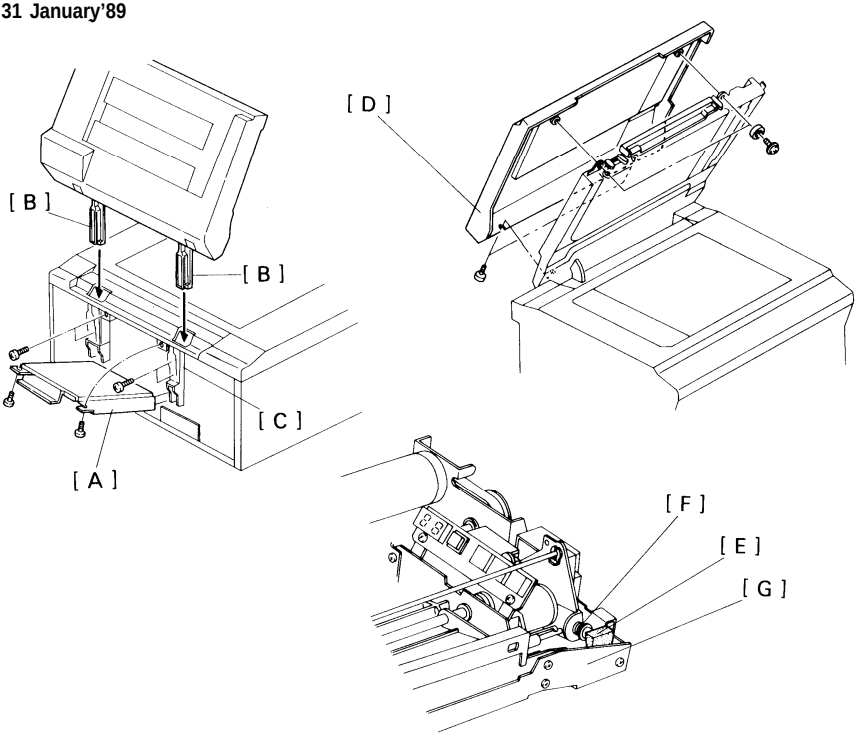
NOTE: Save the above parts for future use.

3. Install the exposure glass holders [G] at the left side of the exposure glass as shown (European version only).

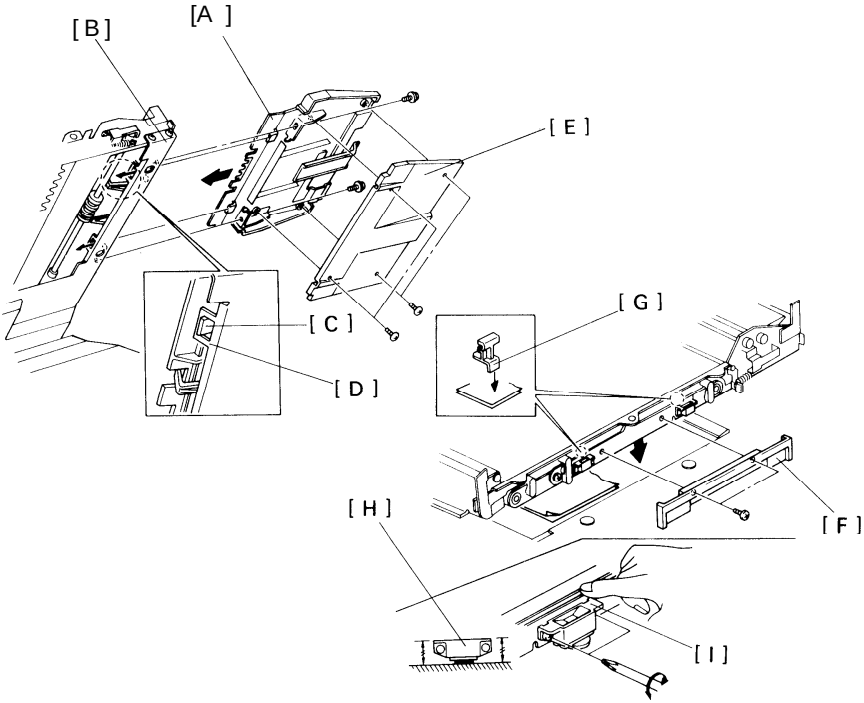
4. Set the flip scale [H] (with the flip scale spring [1]) on the original exit guide [J]; then, mount it as shown (2 flathead screws).

5. Secure two flathead shoulder screws [K] as shown in the figure.

6. Remove the strips of shipping tape [L].



7. Lower the PCB plate [A] (2 screws).
8. Insert the mounting posts [B] into the DF mounting brackets [C].
9. Temporarily secure the mounting posts to the DF mounting brackets (4 screws, M5 x 12).
10. Remove the DF cover [D] (4 screws).
11. Remove the shipping foam [E] between the stopper solenoid [F] and the DF side plate [G].



12. Install the original feed table [A] on the right side of the belt unit [B] (2 screws with washer). (Be sure to engage the 2 hooks [C] of the original table with the docking holes [D] of the belt unit).

13. Install the original table cover [E] under the original table (4 screws).

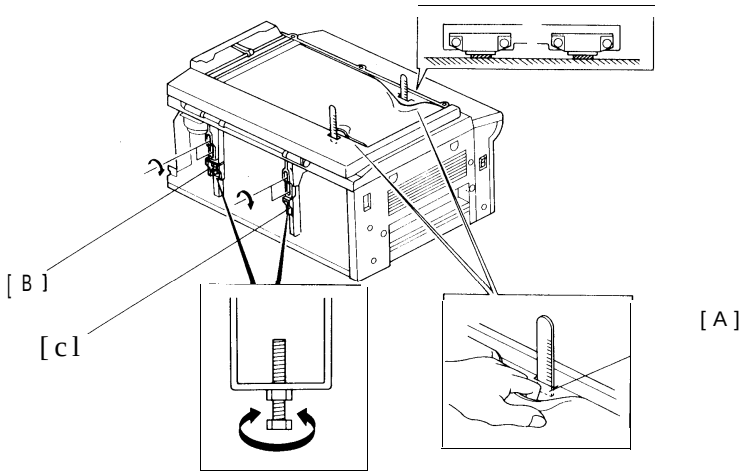
14. Level the DF as follows:

    a) Remove the DF grip plate [F] (2 screws).

    b) Place 2 sheets of A3 (11" x 17") paper between the white belt guide spacers [G] and the exposure glass.

    c) Loosen the mounting screws of the right side magnetic catch [H]. Push down the right side of the magnetic catch bracket [1], then tighten the screws of the right magnetic catch. Repeat this process with the left side magnetic catch.

    d) Remove the 2 sheets of paper.



e) Adjust the height of rear side of the belt unit as follows:

1) Lift the upper part of the feed belt out of the way and measure the distance between the top of the access hole [A] in the pressure roller support bracket and the lower part of the feed belt at the front and rear left corners.

2) Adjust the two amounts so that they are the same by using the left height adjusting bolt [B] on the DF mounting bracket.

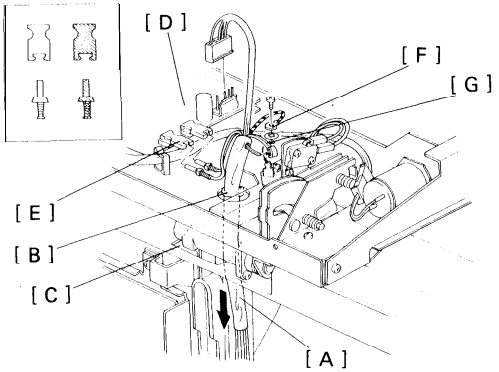
3) Adjust the right rear height adjusting bolt [C] so that the DF closes properly.

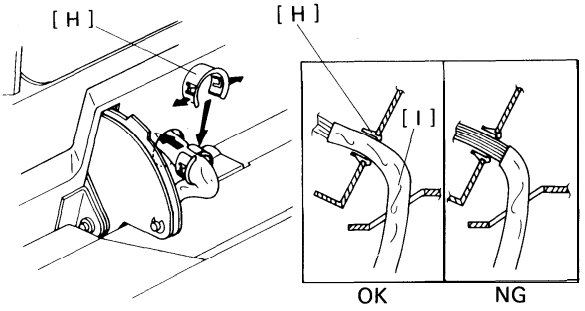
NOTE: Make sure that the belt is properly positioned in the belt guide spacers.

4) Tighten the four screws (M5 x 12) on the mounting posts. Lock the height adjusting bolts [B] and [C] (2 lock nuts).

f) Install the DF grip plate.

g) Check that the DF closes properly.





15. Pass the DF interface harness [A] through the harness hole [B] of the DF and the docking hole of the copier [C].

Avoid sharply bending the fiber optics or they will become damaged.

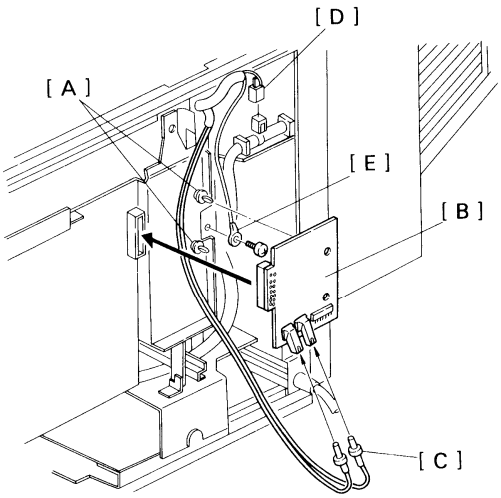
16. Connect the DF interface harness to the DF PCB [D] (3 connectors).

NOTE: The fiber optics connectors [E] have different colours. Be sure to match these colours when making these connections.

17. Secure the DF ground wire [F] on the DF base plate (1 ground screw and toothed washer).

18. Pass the Ty-wrap [G] through the hole of the vinyl tube of the DF harness, and then bind the vinyl tube to the bracket as shown.

19. Open the DF and install the nylon harness bushing [H] from the underside. (This harness bushing should be positioned around the vinyl tube [1] of the DF harness as shown.)



20. Secure the copier PCB plate(2 screws).

21. Fix the two PCB mounting studs [A] on the main board and install the interface board [B]. (This is not necessary if a sorter is already installed in the machine.)

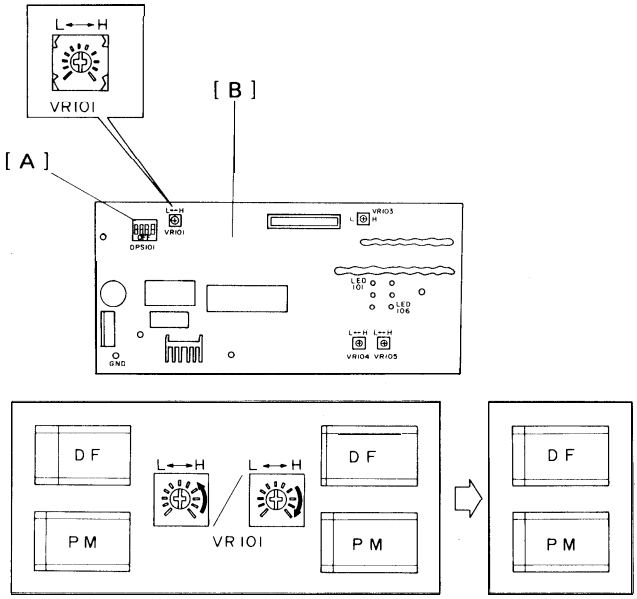
22. Connect the 3 DF connectors.

    a) Connect two fiber optic connectors [C] to the interface board as follows, being careful not to damage them:

    CN806 Brown CN103
    CN807 Black CN104.

    b) Connect the DF harness connector [D] to the copier's ac 4P connector.

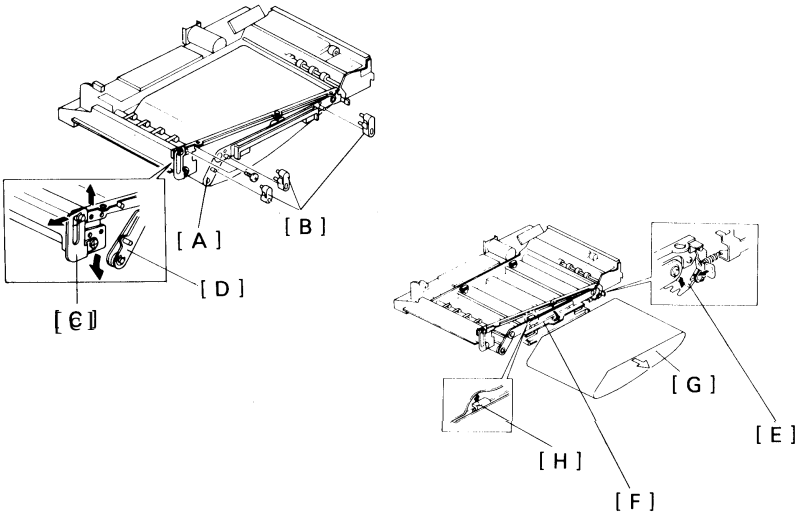
23. Secure the ground wire [E] to the ADF right mounting bracket (1 ground screw and toothed washer).



24. Turn on DIP switch 101-2 [A] on the DF main PCB.
25. Adjust the lead edge registration as follows:
    a) Turn on the copier main switch and make a copy in the platen mode using the flip scale and the test chart.
    b) Keep this copy for reference and mark “PM” (Platen Mode) on the reverse side of it.
    c) Make a copy in DF mode using the test chart.
    d) Adjust the DF registration against the platen mode reference (“PM”) using VR101 on the DF PCB [B]:
        PM > DF: Turn VR101 clockwise
        PM < DF: Turn VR101 counterclockwise.
    e) Continue to repeat steps “c)” and “d)” until the same registration as in step “b)” is achieved.
26. Replace all covers.
27. Check the operation of the DF and copier system.
28. Fill out the New Equipment Condition Report.

REPLACEMENT AND ADJUSTMENT

1. DF Belt Replacement

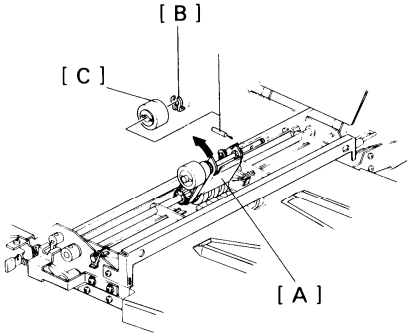


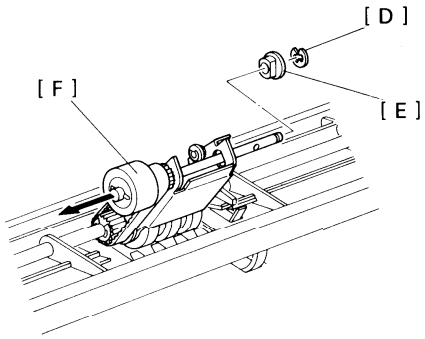
1. Remove the DF cover (4 screws, 2 collars).
2. Remove the 2 screws securing the left side of the front stay [A] and remove the 3 belt unit holders [B].
3. Raise the left end of the front stay and set it in the up position with the lock plate [C].
4. Rotate the belt release bracket [D] counterclockwise and lower the original entrance guide [E].
5. Lower the DF grip bracket [F] and release the belt [G] from the belt guide spacers [H].
6. Slide off the DF belt [G] and replace it.

NOTE: - After installing the DF belt, make sure that the belt is properly positioned in the belt guide spacers.

- When returning the DF grip bracket to its original position, make sure that the DF grip bracket is properly set behind the flathead screw.

2. **Pick-up Roller Replacement**





1, Remove the DF cover (4 screws, 2 collars).

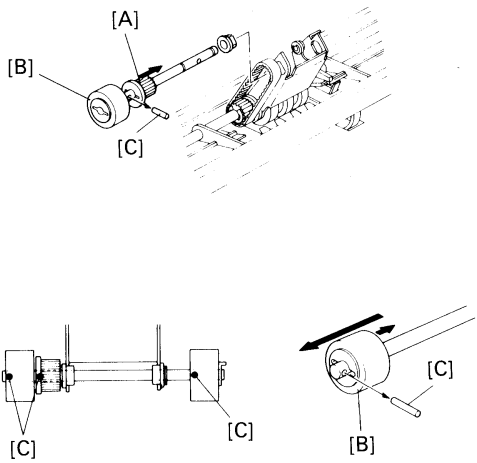
2. Lift up the pick-up roller unit [A] and remove the snap ring [B].

3. Slide off the rear pick-up roller [C].

NOTE: Be careful not to lose the pin.

4. Remove the E-ring [D] and bushing [E].

5. Slide off the front pick-up roller assembly [F].

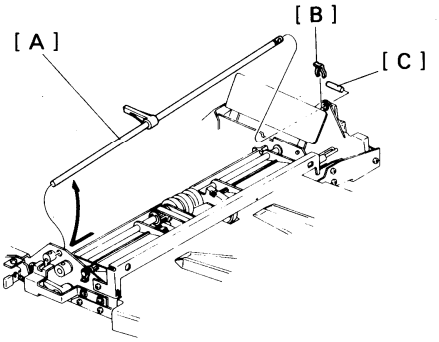


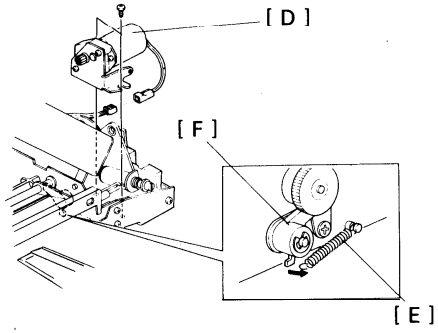
6. Slide of the pulley [A] and the pick-up roller [B].

NOTE: Be sure not to lose the drive pins [C] of the pulley and pick- up roller.

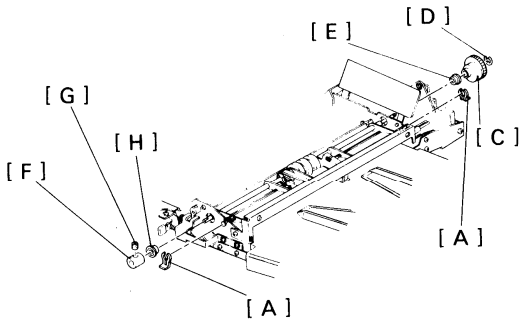
7. Replace the pick-up rollers and reassemble.

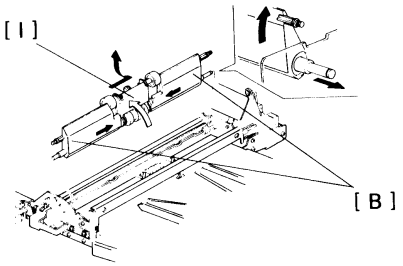
3. Feed Roller Replacement



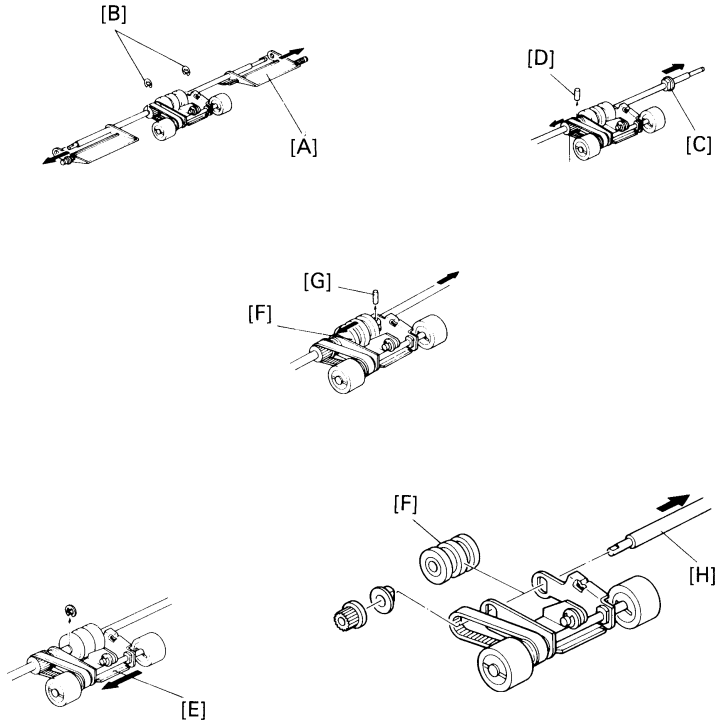


1. Remove the DF cover (4 screws, 2 collars).
2. Remove the pick-up control shaft [A] (1 snap ring [B], 1 pin [C]).
3. Remove the feed-in motor [D] (2 screws).
4. Unhook the spring [E] of the wear prevention lever [F].

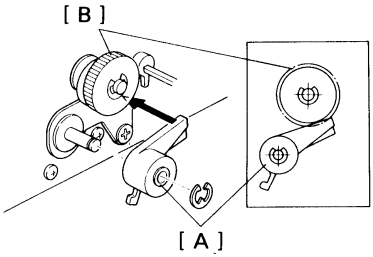


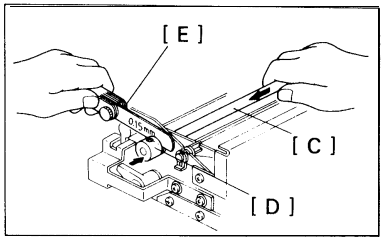


5. Remove the two snap rings [A] fixing the feed-in guides [B].
6. Remove the feed roller drive gear [C] (1 E-ring [D], 1 bearing [E]).
7. Remove the collar [F] (1 Allen screw [G]) and the bearing on the front feed roller shaft [H].
8. Stand the feed roller unit [1] and slide the feed-in guides as shown in the figure.
9. Then slide the unit to the rear, lift the front of the unit, and remove it from the DF.



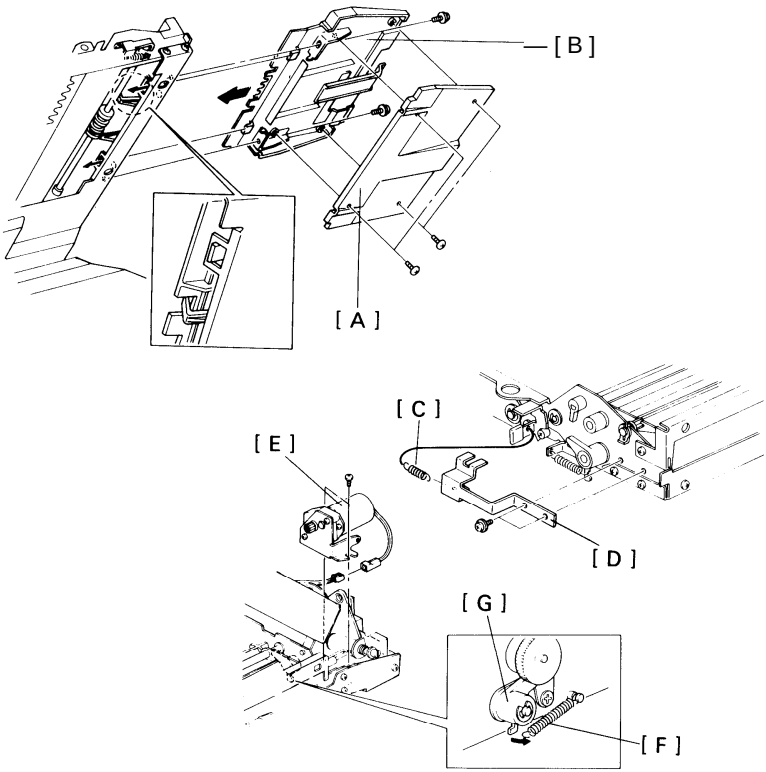
10. Slide off the feed-in guides [A] and remove two E-rings [B].
11. Remove the bushing [C] and slide the pulley towards the front to remove the pulley pin [D].
12. Slide the pick-up roller unit [E] to the front and remove the E-ring.
13. Slide the feed roller [F] to the front and remove the pin [G].
14. Slide off the feed roller shaft [H].
15. Replace the feed roller and reassemble.



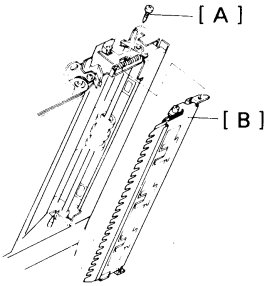


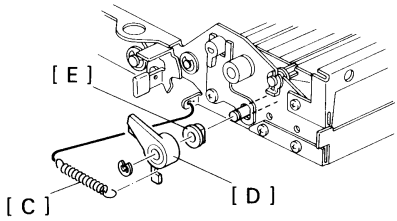
16. When reassembling the feed roller unit, make sure of the following points:
    1) Confirm that the wear prevention lever [A] is to the right of the drive gear [B] as viewed from the rear.
    2) Tighten the Allen screw of the feed roller shaft [C] collar [D] so that the clearance between the bushing and collar is 0.15 mm (check with a thickness gauge [E]).

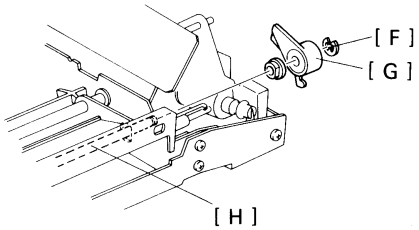
4. **Friction Roller Replacement**



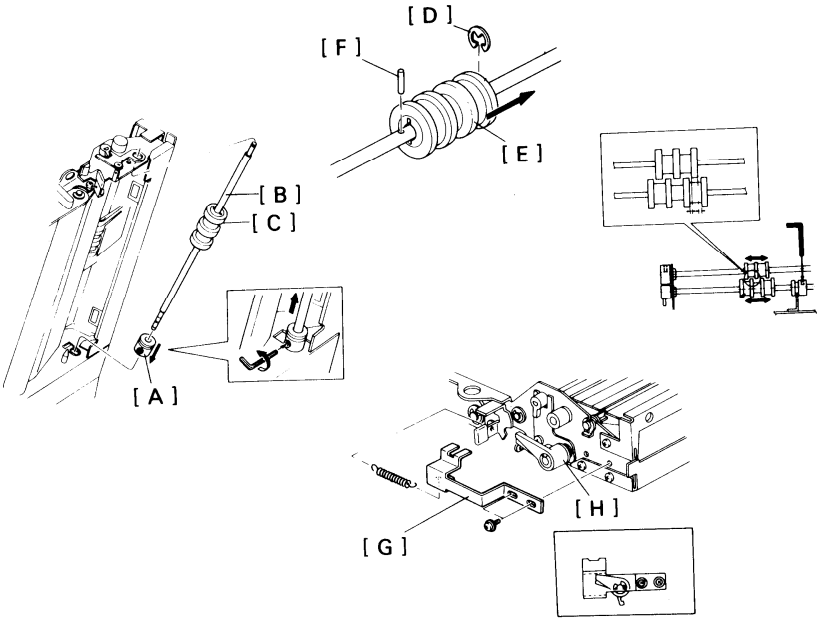
1. Remove the DF cover (4 screws, 2 collars).
2. Remove the original table cover [A] (4 screws).
3. Remove the original table [B] (2 screws).
4. Remove the lever spring [C] and the stopper plate [D] (2 screws).
5. Remove the feed-in motor [E] (2 screws, 1 connector).
6. Unhook the spring [F] of the wear prevention lever [G].







7. Remove the front stud screw [A] and take out the original entrance guide [B].
8. Unhook the spring [C] of the misfeed prevention lever [D] and remove the misfeed prevention lever and the bushing [E] (1 E-ring [F]).
9. Remove the wear prevention lever [G] (1 E-ring) and the bushings on the friction roller shaft [H].



10. Loosen the Allen screw in the collar [A] on the friction roller shaft [B] and remove the friction roller assembly [C].
11. Remove the E-ring [D] and replace the friction roller [E].

NOTE: - Be sure not to lose the pin [F].

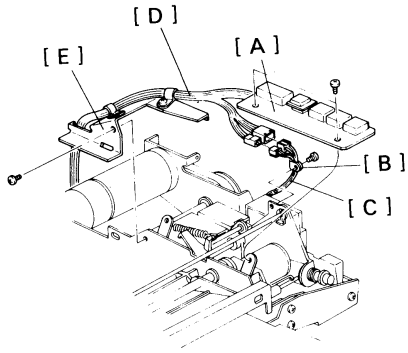
- When reassembling the unit, make sure of the following points:

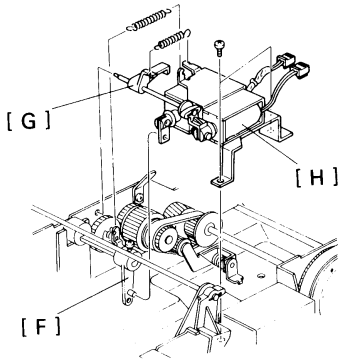
  - When replacing the collar on the friction roller shaft, position the friction roller so that it is centered on the feed roller.

  - When replacing the stopper plate [G], make sure that the misfeed prevention lever [H] is restrained by the stopper plate as shown.

  - Confirm the mounting position of the stopper plate (see Stopper Plate Positioning).

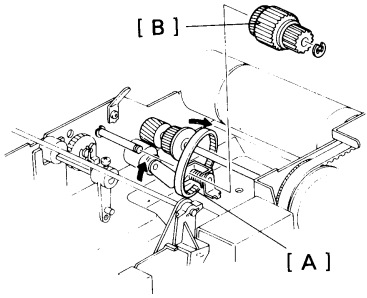
5. **Registration Roller Replacement**

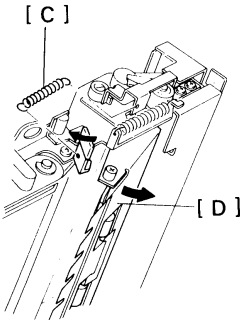


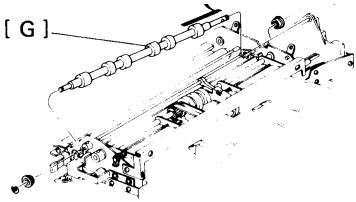


1. Remove the DF cover (4 screws, 2 collars).
2. Remove the indicator board [A] (2 screws).
3. Remove the harness clamp [B] as shown (1 screw).
4. Disconnect the registration solenoid harness [C] and roller release solenoid harness [D] (2 red connectors).
5. Move the indicator board and the harness bracket [E] (1 screw) away from the feed-in section.
6. Remove the springs of the friction roller release lever [F] and the registration clutch lever [G].
7. Remove the solenoid assembly [H] (2 screws).

NOTE: The release solenoid plunger is engaged with the roller release lever.







8. Slip off the timing belt [A] while lifting the belt tightener.

9. Remove the registration clutch assembly [B] (1 E-ring).

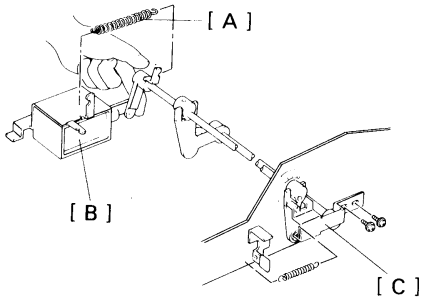
10. At the front, remove the lever spring [C] and lower the original entrance guide [D].

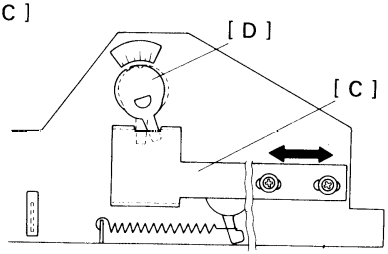
11. Remove the registration drive gear [E] (1 E-ring, 1 pin [F]).

NOTE: Do not lose the pin.

12. Remove the registration roller [G] as shown in the figure (1 E-ring, 2 bearings).

6. Stopper Plate Position Adjustment





Reinstall the stopper plate as follows:

1. Remove the spring [A] of the friction roller release solenoid [B] and keep the solenoid plunger inside the coil.

2. Loosen the two screws of the stopper plate [C].

3. Position the plate so that the groove of the cam [D] aligns with the ".4" calibration mark.

NOTE: - This means that the overlap of the feed and friction rollers is adjusted to 0.4 mm when the friction roller is released from the feed roller.

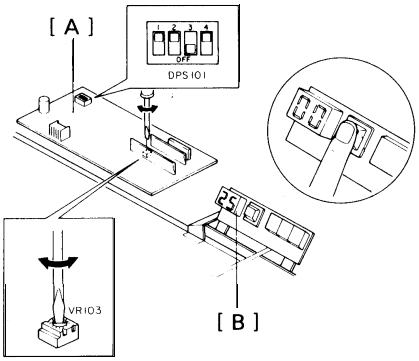
- If the cam cannot align with the ".4" mark, reposition the roller release solenoid by loosening the solenoid mounting screws.

4. Replace the spring of the solenoid.

NOTE: - If multiple feeding occurs, increase the overlap by repositioning the stopper plate.

- If the original becomes smeared, decrease the overlap.

7. DF Belt Drive Motor Speed Adjustment



This adjustment should be done when the DF PCB [A] is replaced.

ADJUSTMENT STANDARD: 2500 ± 30 rpm

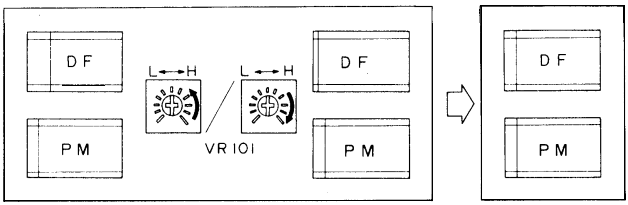
1. Turn off the main switch.
2. Remove the DF cover (4 screws, 2 collars).
3. Lower the DF unit.
4. Turn on DIP switch nos. 101-2 and 101-4 of the DF main board.
5. Turn on the main switch.

   The belt drive motor will start turning, and the left two digits of the motor speed will 'be displayed in the original counter. To display the second two digits of the motor speed, press the Counter Reset key.

   For example, if the motor speed is 2500 rpm, "00" will be displayed on the original counter [B] when the Counter Reset key is pressed; **"25" will** be displayed when it is not pressed.

6. Adjust the motor speed to 2500 ± 30 rpm by turning VRI 03 on the DF main board.
7. Turn off the main switch, turn off DIP switch nos. 101-2 and 101-4 to the normal position (DIP switch no. 101-1 is on and all others are off), and reassemble.

8. Lead Edge Registration Adjustment



1. Adjust the lead edge registration as follows:
   a) Turn on the copier main switch and make a copy using the test chart in the platen mode using the flip scale to align the original.
   b) Keep this copy for reference and mark "PM" (Platen Mode) on the reverse side of it.
   c) Make a copy using the test chart with the DF.
   d) Adjust the DF registration to match the "PM" reference copy using VR101 on the DF PCB [B].

      PM > DF: Turn VRI 01 clockwise
      PM < DF: Turn VR1 01 counterclockwise.

   e) Continue to repeat steps c) and d) until you achieve the same registration as in step b).
2. Replace all covers.
3. Check the operation of the DF and copier system.
4. Fill out the New Equipment Condition Report.

SECTION 8

SORTER

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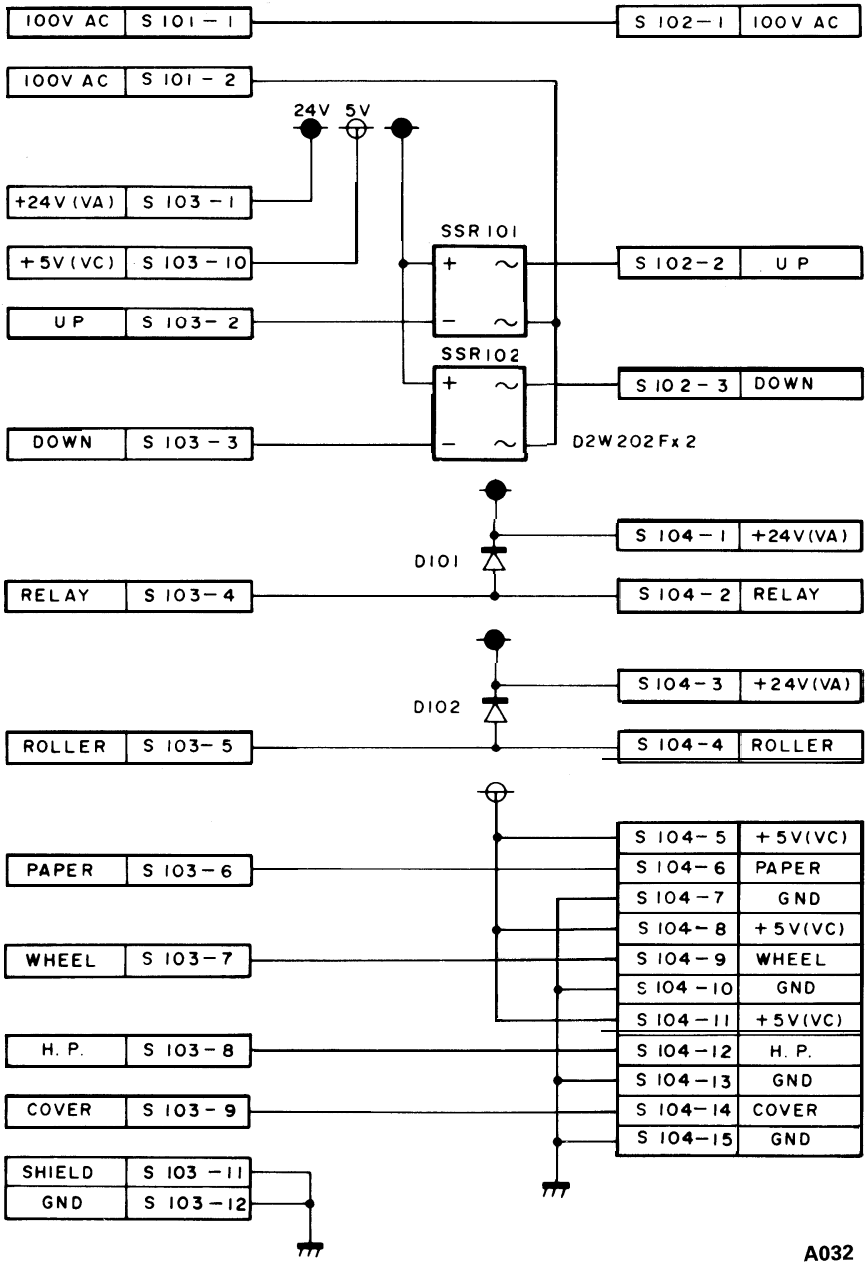
SORTER CONTROL BOARDSCHEMATiC

SORTER CONTROL BOARD SCHEMATIC

31 January '89



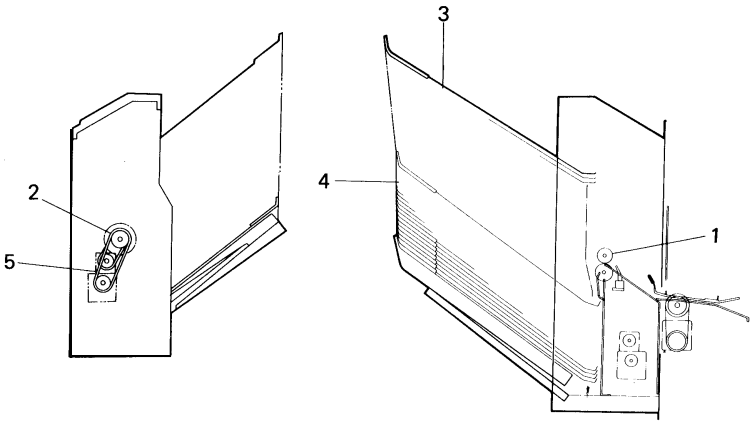
A032

SORTER

SPECIFICATIONS

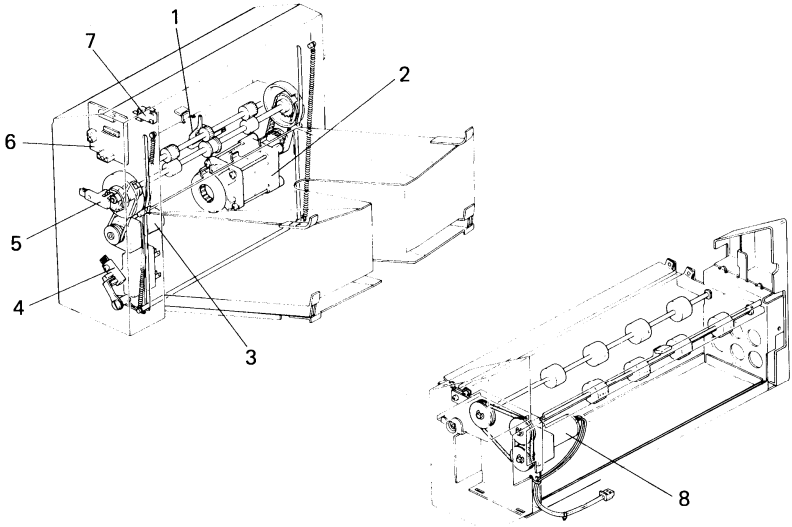
Paper Size for Bins:	**Maximum A3, 11" x 17"** **Minimum B6, 5 1/2" x 8 1/2"**
Paper Weight:	**50 to 110 grams (14 to 28 lb)**
Number of Bins:	**20 bins + proof tray**
Bin Capacity:	**Sort Mode 30 sheets/A4 (8 1/2" x 11")** **10 sheets/A3 (11" x 17")** **Stack Mode 30 sheets/A4 (8 1/2" x 11")** **10 sheets/A3 (11" x 17")**
Proof Tray Capacity:	**100 sheets (all sizes)**
Power Source:	**100 V, 50/60 Hz, 0.6A (from copier)**
Power Consumption:	**60 w**
Dimensions: **(W XDXH)**	**346 mm x 474 mm x 388 mm** **13.6" x 18.7" x 15.3"**
Weight:	**12.4 kg (27.3 lb)**
Copier Interface **Equipment:**	**Sorter adapter type E** **Interface PCB type E**

MECHANICAL COMPONENT LAYOUT



1. Exit Rollers
2. Bin Drive Wheel
3. Proof Tray
4. Bins
5. Roller Drive Belt

ELECTRICAL COMPONENT LAYOUT



1. Paper Sensor (S-31)
2. Wheel Drive Motor (M-11)
3. Roller Drive Motor (M-12)
4. Bin Home Position Sensor (S-32)
5. Wheel Sensor (S-33)
6. Sorter Control PCB (PCB-9)
7. Cover Safety Switch (SW-9)
8. Relay Drive Motor (M-13)

BASIC OPERATION

1. Clear Mode

When the main switch of the copier is turned on, the sorter automatically assumes the clear mode. It also changes to the clear mode if the sort or stack mode is recalled or if the interrupt key is pressed, In the clear mode, all copies are stacked on the proof tray.

Sorter operation starts when a sheet of copy paper actuates the copier exit sensor. At this time the roller drive motor and relay drive motor energize. The motors de-energize when the paper exits the copier and the paper sensor is deactuated. The paper sensor signal is sent to the copier through an interface board to check for paper misfeed. The wheel drive motor does not turn on when in the clear mode.

2. Sort **Mode**

After the sort mode is selected by pressing the Sorter key, the wheel drive motor turns on to move the proof tray up. When the first sheet of paper activates the paper exit sensor, the roller drive motor turns on. Shortly after the paper sensor turns off (345 ms later), the wheel drive motor turns and advances the bins one step. When the wheel sensor is activated, the wheel drive motor turns off.

3. **Stack Mode**

As in the sort mode, the roller drive motor turns on when the first sheet of paper actuates the copier exit sensor. All copies of the copy run are then fed to the first bin. When the final copy passes the paper sensor, the wheel drive motor turns on and advances the bins one step.

There are no limits on the number of copies that can be entered up to the full **99** copy limit of the copier. However, the physical capacity of the bins is a good deal less. (See “Bin Capacity” in the specifications.)

When all 20 bins have been used, the wheel drive motor turns on until all the bins have been lowered (including the proof tray). At the same time, the Max indicator blinks.

4. **Example of Sort Mode Operation**

"3" copies entered/Start key pressed 3 times.

- **Start Key ON -**

1) The first copy feeds to the first bin. After the paper detector turns off, the wheel drive motor turns on and moves the first bin up.

2) The same action as #1.

3) The third copy feeds to the third bin. The wheel drive motor does not turn on after the paper sensor turns off. (The sorter will stay at this position until auto-reset or until copying resumes.)

- **Start Key ON -**

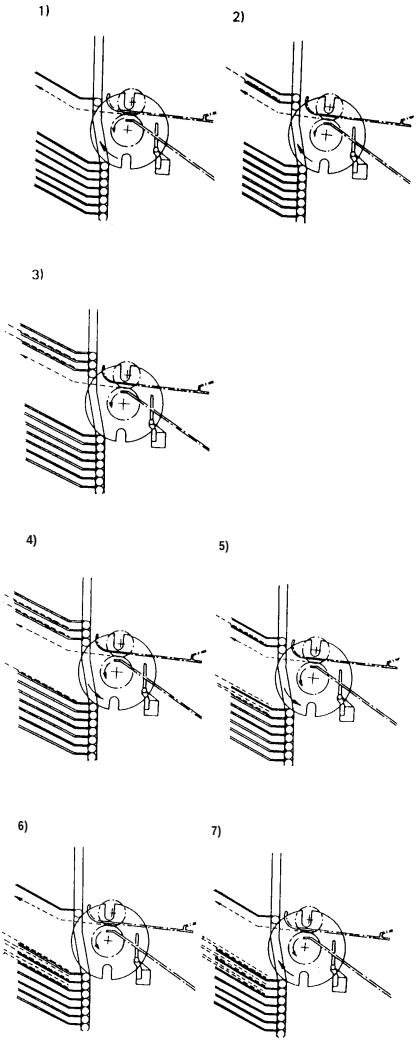
4) The first copy is fed to the third bin. After the paper detector turns off, the wheel drive motor turns on and moves the second bin down.

5) The same as #4.

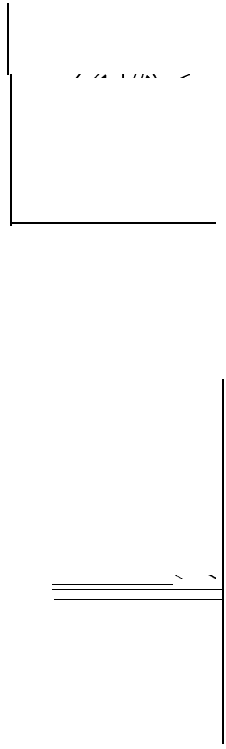
6) The third copy is fed to the first bin. The wheel drive motor does not turn on after the paper sensor turns off.

- **Start Key ON -**

7) The first sequence (1, 2, and 3) is repeated.



BIN DRIVE MECHANISM



The bin drive mechanism moves the bins [A] up and down to receive copies under the direction of the copier CPU. The main components in this mechanism are the wheel drive motor [M 11], the two transfer wheels [B], the wheel sensor [S33], and the bins themselves.

Pins on either side of each bin are inserted into slots in the sorter side frame. The pins slide up and down in these slots. The bins rest on each other with the lower one resting on the lift bar [C]. The springs [D], on either end of the lift bar, lift it up forcing the bin pins against the transfer wheels. Plastic spacers [E] on the left end of the bins hold them apart.

To move the bins up, the bin drive motor turns clockwise (as viewed from the front). A timing belt [F] turns the transfer wheels [G].

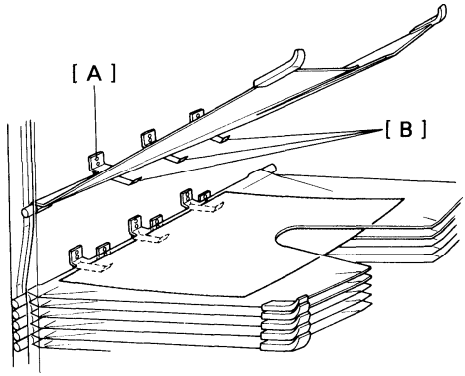
The transfer wheels have two slots in them 180 degrees apart. As the transfer wheels turn, these slots engage the pins of the bins and lift them up. Each time the transfer wheels turn 180 degrees, they raise one bin.

The CPU counts the bins using the wheel sensor. A cylindrical actuator on the front transfer wheel turns the wheel sensor on and off. This actuator has two notches that are 180 degrees apart. The wheel sensor turns on each time one of the slots passes through the sensor.

To move the bins down, the CPU reverses the bin drive motor and the above process reverses.

The home position sensor is located at the lower rear end of the sorter. When all the bins are lowered, the lift bar presses down on the actuator, actuating the sensor. The CPU checks the sensor whenever the power is turned on. At this time, if the bins are not in the home position, the sensor will deactuate and inform the CPU to return the sorter to the home position.

BINS

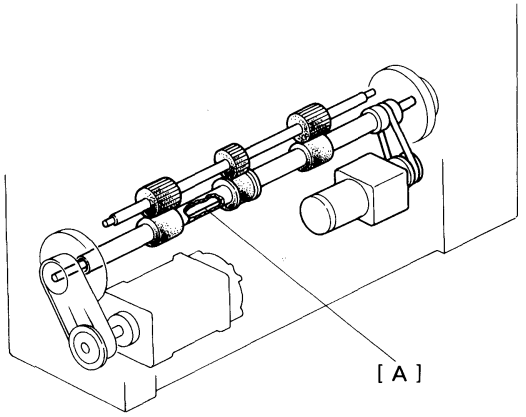


The proof tray and the twenty bins are all basically the same. Formed out of thin flexible steel plate, they have spacers on the left end to hold them apart, and pins at the front and rear of the right end, which are inserted in guide slots in the sorter frame.

On the right edge, the bins have stoppers [A] which prevent copies from sliding back into the sorter after they have been fed out. The pattern of these stoppers is different for even and odd numbered bins.

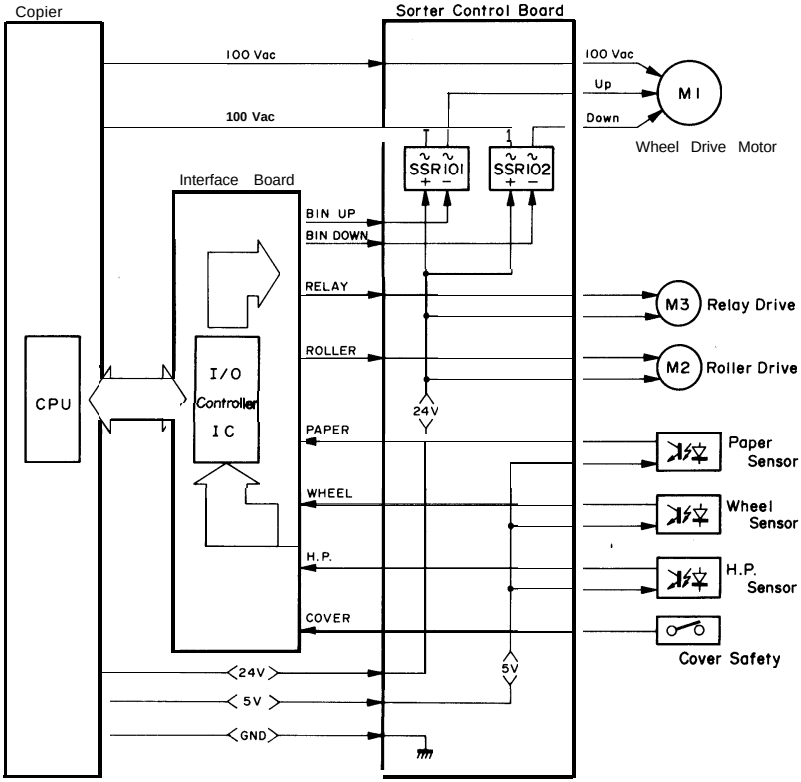
Three leaf springs [B] on the underside of each bin hold the copies flat in the underlying bin.

EXIT ROLLERS



The exit roller shaft is hollow and is mounted on the transfer wheel shaft [A] (coaxial). When the copy actuates the copier's exit sensor, the CPU sends a signal to the sorter to turn on the roller drive motor. The roller drive motor turns off at the same time as the copier main motor (M-12).

ELECTRICAL CONTROL



The copier CPU, through an I/0 controller IC on the interface board, controls all the functions of the sorter.

The copier supplies 100 volts ac to the wheel drive motor and the SSRS. SSR 101 turns the wheel drive motor to move the bins up and SSR 102 is for the down operation.

The copier supplies two dc power levels, + 5 volts and +24 volts, for the dc components.

Signals from the sensors and the safety switch are sent to the copier CPU through the interface board. The copier CPU operates motors through the interface board and SSRS.

SORTER INSTALLATION

1. Accessory Check

Check the quantity and condition of the accessories in the box according to the following list:

1. Installation Procedure (115V - English/220V - five languages)	1
2. New Equipment Condition Report	1
3. Envelope-NECR (1 15V only)	1
4. Grounding Screw	1
5. Toothed Washer	1
6. Knob Screw	2
7. Spacer 4.2 x 12 x 2.9	2
8. Multilingual Decal (220/240V only)	2

Interface PCB Type E and Sorter Adapter Type E are also required to install the sorter.

Check the accessories according to the following list:

Sorter Adapter Type E box:

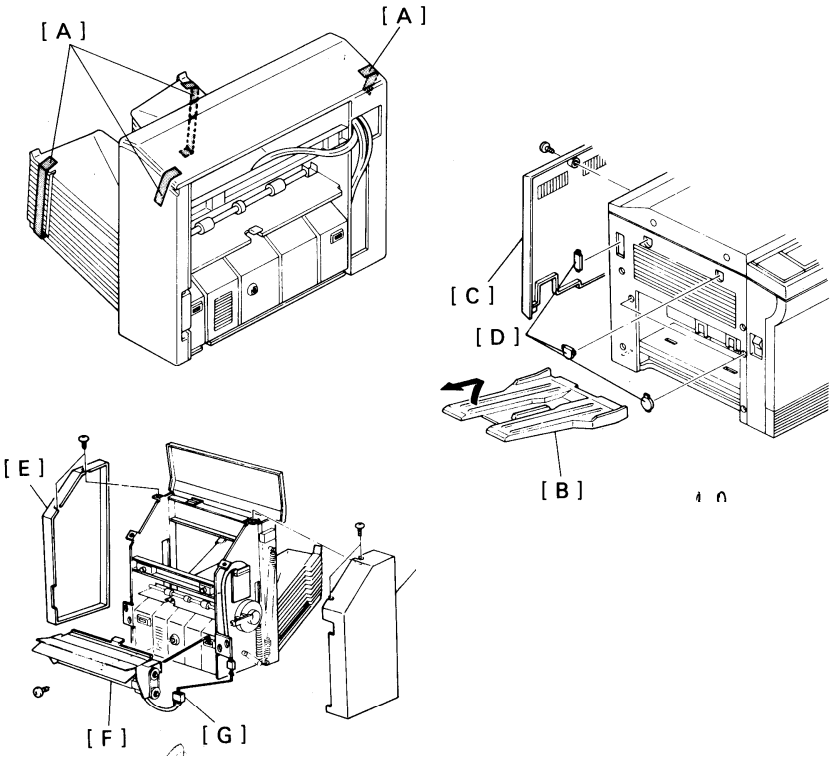
1. Mounting Stud	2
2. Screw	1

Interface PCB Type E box:

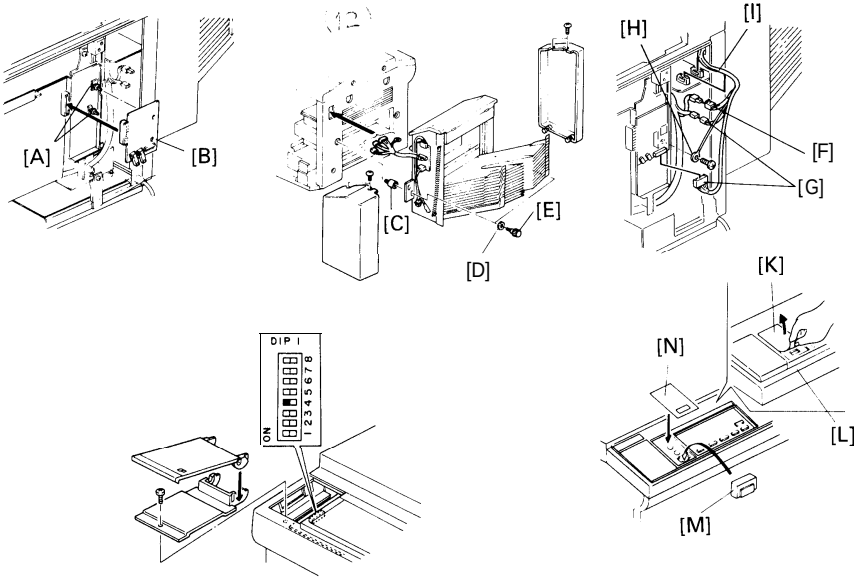
1. PCB Mounting Stud	2

NOTE: - The interface PCB is not necessary if a DF is already installed in the system.
- The sort/stack key top and key cover are enclosed with the copier.

2. **Installation Procedure**



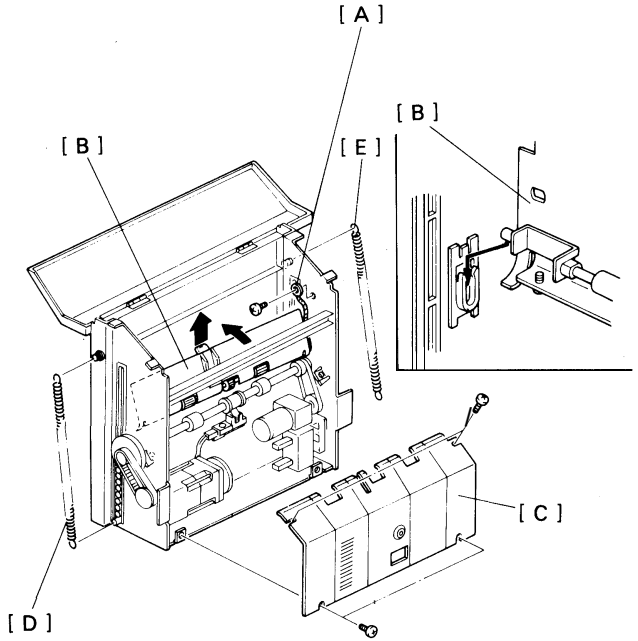
1. Remove the strips [A].
2. Turn off the main switch and unplug the power supply cord of the copier.
3. Remove the receiving tray [B], and rear cover [C] (2 screws).
4. Remove the five plastic caps [D] from the left cover.
5. Remove the sorter covers [E] (2 screws each).
6. Install the sorter adapter [F] on the sorter (1 screw).
7. Connect the sorter adapter harness [G] to the sorter (free white 2P connector).



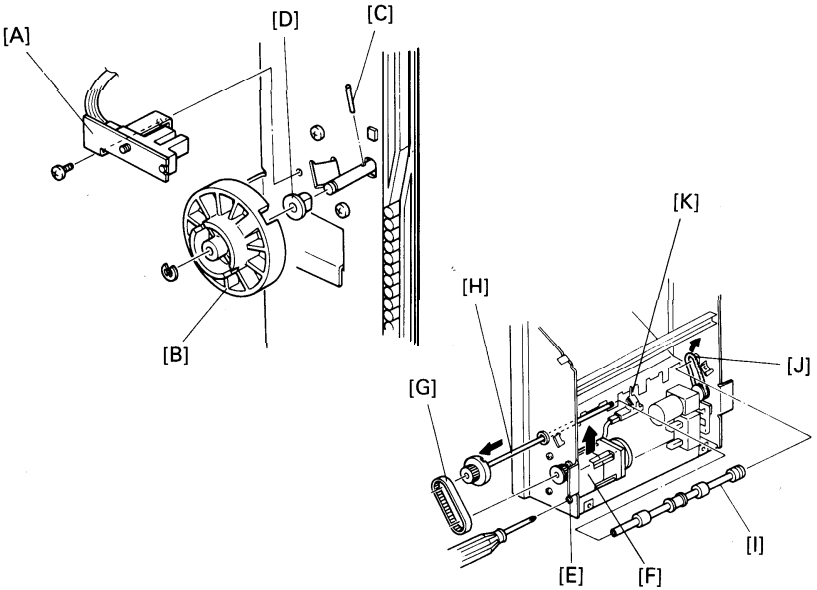
8. Fix the two PCB mounting studs [A] on the main board bracket and install the interface board [B].
9. Screw the mounting studs [C] into the docking hole.
10. Mount the sorter on the copier. Pass the harness through the access hole.
11. Fix the sorter unit to the copier with the spacers [D] and two knob screws [E].
12. Connect the sorter ac harness [F] (free red 2P connector).
13. Connect the sorter dc harness [G] (CN102, free white 4P connector).
14. Secure the sorter ground wire [H] (1 screw with toothed washer).
15. Clamp the sorter harness [1] as shown in the figure.
16. Turn on DIP switch 1-4 [J] on the operation panel.
17. Mount the sorter covers and copier rear cover.
18. Peel off the panel cover [K] at the left end of the operation panel [L].
19. Install the Sort/Stack key top [M] and adhere the Sort/Stack key cover [N].
20. Check the sorter's operation and fill out the New Equipment Condition Report.

REPLACEMENT AND ADJUSTMENT

1. Exit Roller and O-Ring Replacement



1. Remove the sorter from the copier and the sorter adapter from the sorter.
2. Remove the front and rear covers (2 screws each).
3. Remove the ground wire [A] of the upper guide plate [B] (1 screw).
4. Swing the guide plate up, then remove it by carefully pulling it up.
5. Remove the inner cover [C] (4 screws).
6. Unhook the front [D] and rear [E] pressure springs.



7. Remove the wheel sensor assembly [A] (1 screw).

8. Remove the rear transfer wheel [B] (1 E-ring).

NOTE: Be sure not to lose the pin [C] of the wheel.

9. Remove the pin and bushing [D].

10. Loosen the four mounting screws [E] of the wheel drive motor [F].

11. Lift the wheel drive motor and slip off the timing belt [G].

12. Slide off the wheel drive shaft [H] and remove the exit roller [1] and O-ring [J].

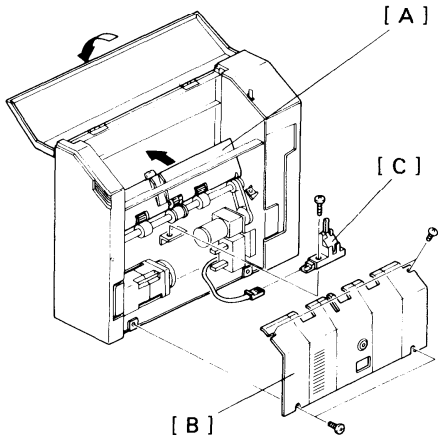
Do not damage the paper sensor [K] when removing the exit roller.

13. Replace the exit roller and O-ring, then reassemble.

NOTE: - When reinstalling the wheel sensor assembly, be sure that the sensor does not touch the wheel.

- When remounting the wheel drive motor, adjust the timing belt tension. (See the section on Timing Belt Tension Adjustment.)

2. Paper Sensor Replacement

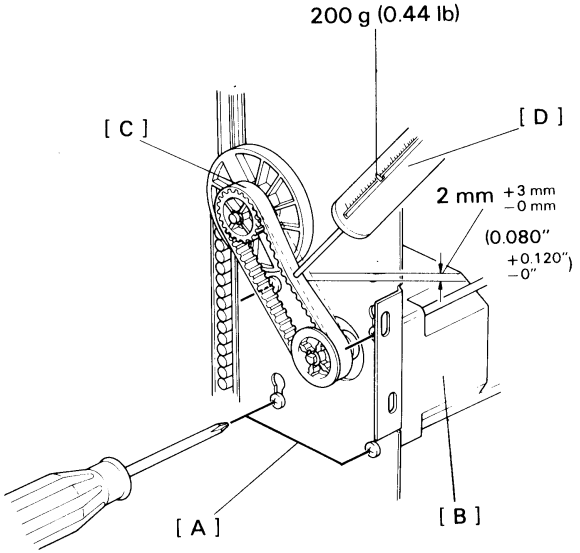


1. Remove the sorter from the copier and the sorter adapter from the sorter.
2. Swing up the guide plate [A].
3. Remove the inner cover [B] (4 screws).
4. Replace the paper sensor [C] (1 screw and 1 connector) and reassemble.

To avoid damaging the sensor, do not over-tighten the sensor mounting screw.

3. Timing Belt Tension Adjustment

ADJUSTMENT STANDARD: $2\ ^{+3}_{-0}$ mm; $0.08\ ^{+0.12}_{-0}$ inches
(deflection at 200 g (0.44 lb) pressure)



1. Remove the front cover.
2. Loosen the four mounting screws [A] of the wheel drive motor [B].
3. Press the timing belt [C] with a tension gauge [D] as shown in the figure and adjust the tension by repositioning the wheel drive motor.

SECTION 9

LARGE CAPACITY TRAY

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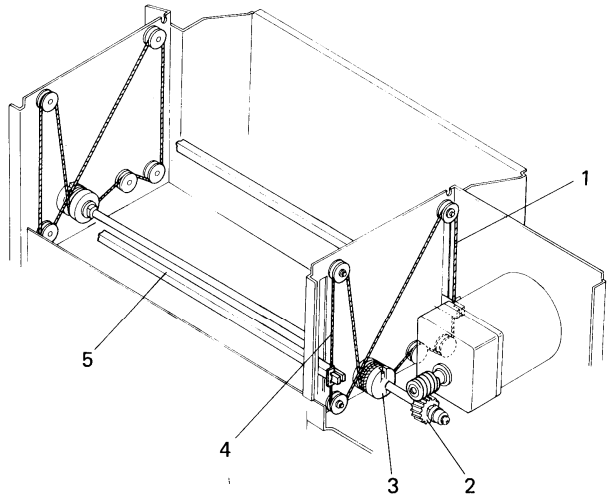
LCT CONTROL BOARD SCHEMATIC

LARGE CAPACITY TRAY

SPECIFICATIONS

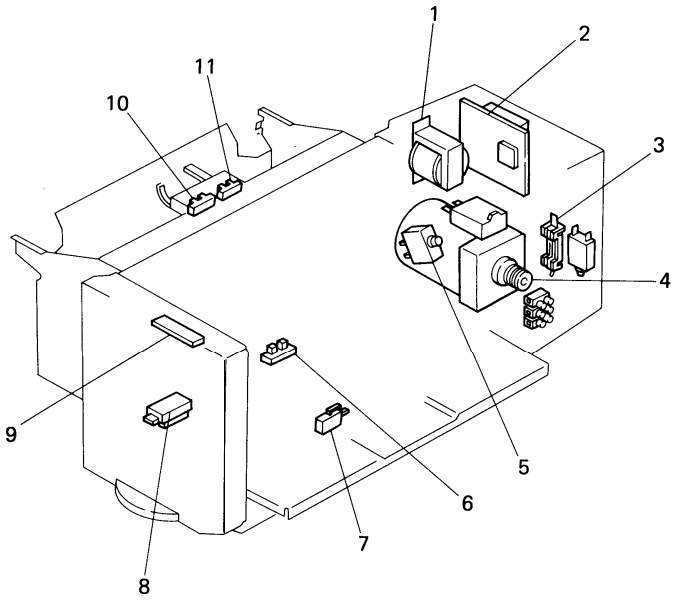
Copy Paper Size:	B4 (length) A4 (length or width) 65 (length or width) 8 1/2" x 14" (length) 8 1/2" x 11" (length or width)	
Copy Paper Weight:	50 g to 110g (14 lb to 28 lb)	
Tray Capacity:	1,000 sheets (may vary slightly depending on paper weight)	
Lift Time:	Maximum:	12 seconds (50 Hz) 10 seconds (60 Hz)
Power Source:	220 V/60 Hz 220 V/50 Hz 240 V/50 Hz 110 V/60 Hz 115 V/60 Hz	0.15A 0.15A 0.15A 0.3 A 0.3 A
Power Consumption:	Maximum 30 W	
Dimensions: (W XDXH)	410 mm x 545 mm x 220 mm 16.2" **X** 21.5" **X** 8.7"	
Weight:	12 kg (26.4 lb)	

MECHANICAL COMPONENT LAYOUT



1. Drive Wire
2. Drive Gears
3. Drive Pulley
4. Tray Wire
5. Lift Rods

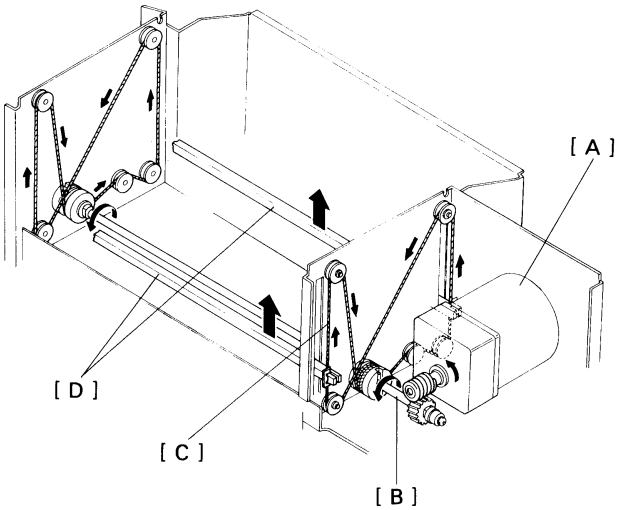
ELECTRICAL COMPONENT LAYOUT



1. LCT transformer (T-2)
2. LCT PCB (PCB-12)
3. Ac fuse (F-2) (220 V)
3. Circuit breaker (CB-2) (115 V)
4. LCT motor (M-17)
5. LCT safety switch (SW-11)

6. Tray down sensor (S-39)
7. Positioning switch (SW-1 2)
8. Paper size sensor (S-40)
9. LCT operation panel (PCB-13)
10. Paper end sensor (S-41)
11. Upper limit sensor (S-42)

MECHANICAL OPERATION

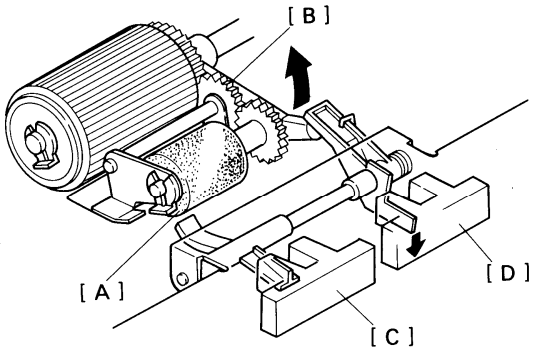


1. Drive Mechanism

A reversible ac motor [A] drives the LCT'S bottom plate up and down.

The motor's drive is transmitted directly to the tray drive shaft [B] via a worm gear and worm wheel. The tray wires [C] have braces on them; these braces hold the ends of the two lift rods which support the tray bottom plate. The braces on the wires raise the lift rods [D] and the tray bottom plate when the pulley turns counterclockwise, and they lower them when the pulley turns clockwise.

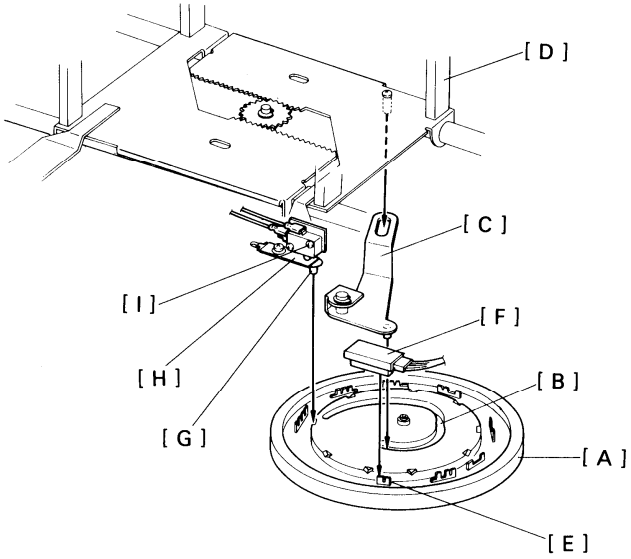
2. Pick-up Roller Mechanism



The pick-up roller [A] is driven by a drive gear [B] to initialize feed paper from the LCT.

The paper end sensor [C] and the upper limit sensor [D] are incorporated in the LCT not the copier. The paper end sensor is used to detect paper end and the upper limit sensor detects when the tray has reached its upper limit when the tray is being raised.

3. **Paper Size Detection**



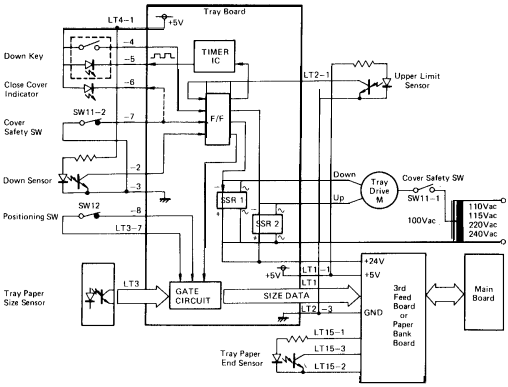
The paper size dial controls side post positioning and paper size detection.

When the paper size dial [A] is rotated, the cam groove [B] moves the size lever [C], which repositions the guide posts [D]. When the dial reaches a standard paper size, one of the actuator plates [E] enters the paper size sensor [F]. At the same time, the pin [G] on the leaf spring [H] drops into a notch on the inside rim of the dial and the positioning switch [1] de-actuates.

When the positioning switch opens, the scan signal is applied to the LCT paper size sensor. The paper size sensor then reads the pattern of the actuator plate and sends paper size data to the copier's CPU.

When the paper size dial is positioned at a non-standard paper size, the positioning switch is actuated (closed). In this case, the LCT cannot be used; the Load Paper indicator lights and no paper size is displayed on the operation panel. This prevents the skewing that would occur if the guide posts were not at the correct position.

ELECTRICAL OPERATION



1. **Down Operation**

The bottom plate moves down only when the Down key is pressed or paper end occurs, When the Down key is pressed, the flip-flop changes state (all outputs change from LOW to HIGH or vice versa). Then, three things happen simultaneously: (1) The gate circuit turns off, preventing size data from being sent to the copier; (2) The timer circuit turns on, causing the LED in the down key to blink; and (3) SSR1 turns on, energizing the drive motor to move the tray down.

The down sensor is actuated when the bottom plate is fully lowered. This causes the flip-flop to change back to its original state, which turns off SSR1 and resets the timer circuit. The LED in the Down key stays continuously on.

2. **Up Operation**

Opening and closing the upper or side LCT cover while the bottom plate is in the down position starts the up operation. This causes the gate circuit to send paper size data to the copier. At the same time the cover safety switch changes the state of the flip-flop and the flip-flop energizes SSR2, which turns on the drive motor to move the tray up. The drive motor stays on until the paper pushes up the pick-up roller. The actuator on the pick-up roller bracket then moves out of the upper limit sensor; this again changes the flip-flop's state and the motor stops.

The cover safety switch prevents operation if the cover is open as this opens the ac 100 volt line.

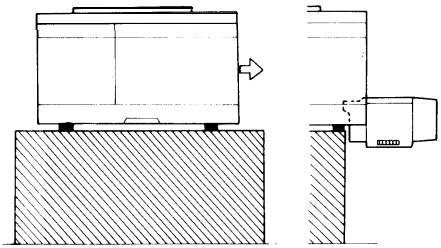
LARGE CAPACITY TRAY INSTALLATION

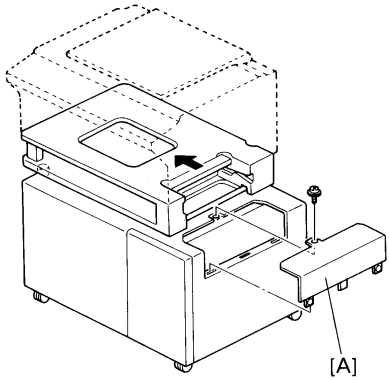
1. Accessory Check

Check the quantity and condition of the accessories in the box according to the following list:

1. Installation Procedure (115 V - English only/220 V - five languages)	1
2. New Equipment Condition Report	1
3. Envelope - NECR (115 V only)	1
4. Pick-up Roller Assembly	1
5. Feed Gear	1
6. Mounting Bracket (Type A, B, C)	6
7. Screw (M4 x 6)	4
8. Screw (M4 x 8)	1
9. Screw (M4 x 10)	2
10. Clamper	1
11. Caution Decal (115 V - English only/220 V - five languages)	1
12. Multilingual Decals (220/240 V only)	1

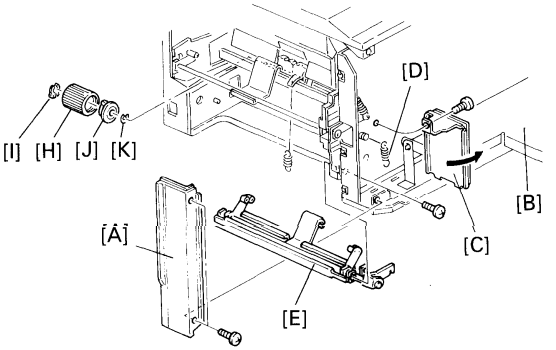
2. Installation Procedure

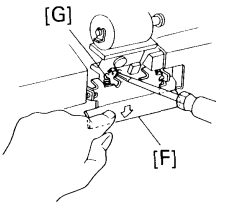




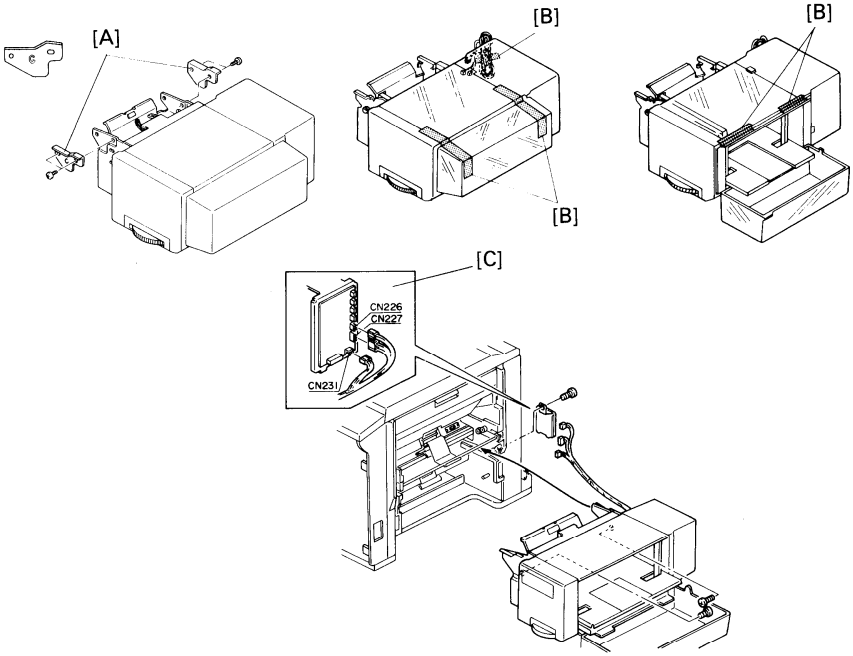
1. Turn off the main switch and unplug the power supply cord of the copier.
2. Move the copier to the left and remove the cover plate [A] on the right side of the system table (1 screw), then reposition the copier on the table.

NOTE: If this system does not have the special system table, move the copier to the right so that the Large Capacity Tray can hang over the edge of the table as shown above.





3. Remove the rear cover (2 screws).
4. Remove the rear right side cover [A] (2 screws).
5. Lower the main PCB plate [B] and remove the paper feed PCB [C] (1 screw).
6. Remove the cassette arm lever spring [D].
7. Remove the cassette arm assembly [E] (1 screw).
8. Press the pad positioning plate [F] down and unhook the spring [G] using a small screw driver.
9. Slide off the feed roller [H] (1 snap ring [1]).
10. Remove the nylon hub [J] from the feed roller.
11. Remove the E-ring [K] of the feed roller shaft.
12. Reinstall the paper feed PCB and the rear right side cover.



13. Install the mounting bracket [A] (Type C, Chrome) on the large capacity tray (2 screws, M4 x 6 each).

14. Remove the 5 strips of shipping tape [B].

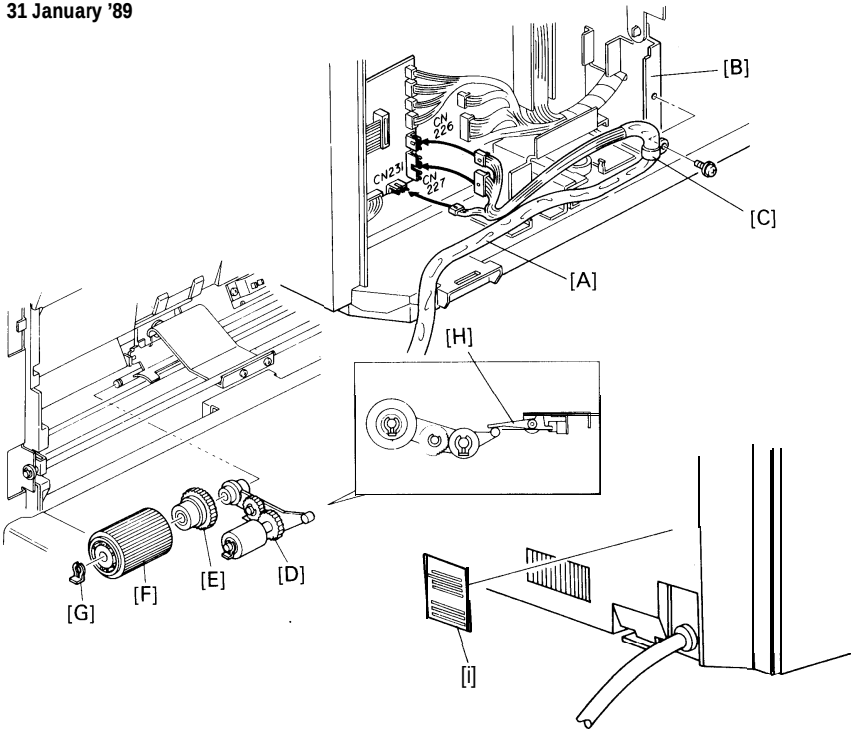
15. Place the large capacity tray in the cassette holder on the 2nd feed station.

NOTE: Make sure that the rib of the tray side plate fits into the groove of the cassette holder.

16. Open the side and top covers and secure the tray to the 2nd feed station (2 screws, M4 x 10).

17. Disconnect CN226 and CN227, and set these connectors to the harness clamp.

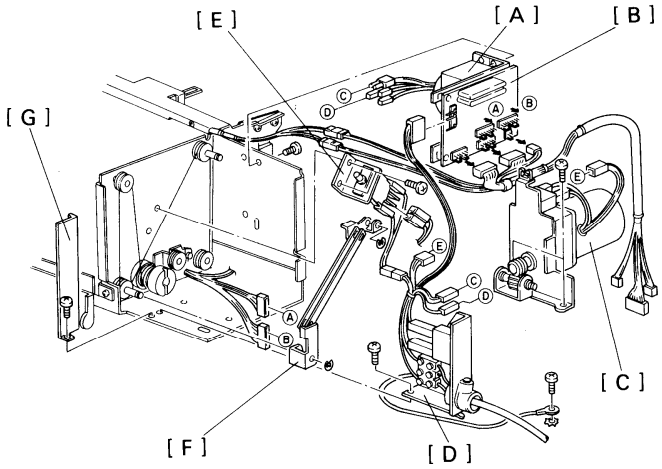
18. Connect the tray harness to the paper feed PCB [C] as follows:
    * 3p connector to CN226
    * 4p connector to CN231
    * 7p connector to CN227



19. Clamp the LCT harness [A] to the support bracket [B] of the PCB plate with the nylon wire clamp [C].
20. Install the pick-up roller assembly [D] on the feed roller shaft.
21. Install the gear [E] on the feed roller shaft.
22. Reinstall the feed roller [F] (1 snap ring [G]).
23. Make sure that the paper position feeler [H] is positioned as shown.
24. Reinstall all covers.
25. Stick the caution decal [1] on the copier rear cover.
26. Check the operation of the Large Capacity Tray.
27. Fill out the New Equipment Condition Report.

REPLACEMENT AND ADJUSTMENT

1. Tray Wire Replacement



Unplug the tray power supply cord.

- Front Wire -

1. Remove the following parts:
   1) Front cover (2 screws and 1 connector)
   2) Nylon clamp holding the operation board harness (1 screw)

- Rear Wire -

1. Remove the LCT from the copier.

2. Remove the following parts:

1) Remove cover (5 screws)

2) Transformer assembly [A] with tray main board [B] (1 screw, 8 connectors, and 1 nylon clamp)

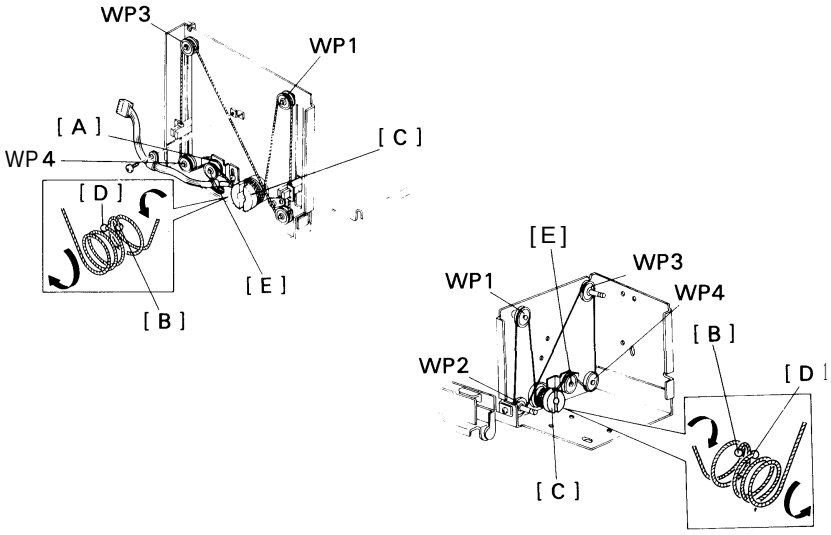
3) Drive motor assembly [C] (2 screws and 1 connector)

4) Ac power terminal [D] (2 screws and 1 ground wire)

5) Safety switch assembly [E] (2 short screws)

6) Safety switch actuator assembly [F] (2 E-rings)

7) Shield plate [G] (4 screws)

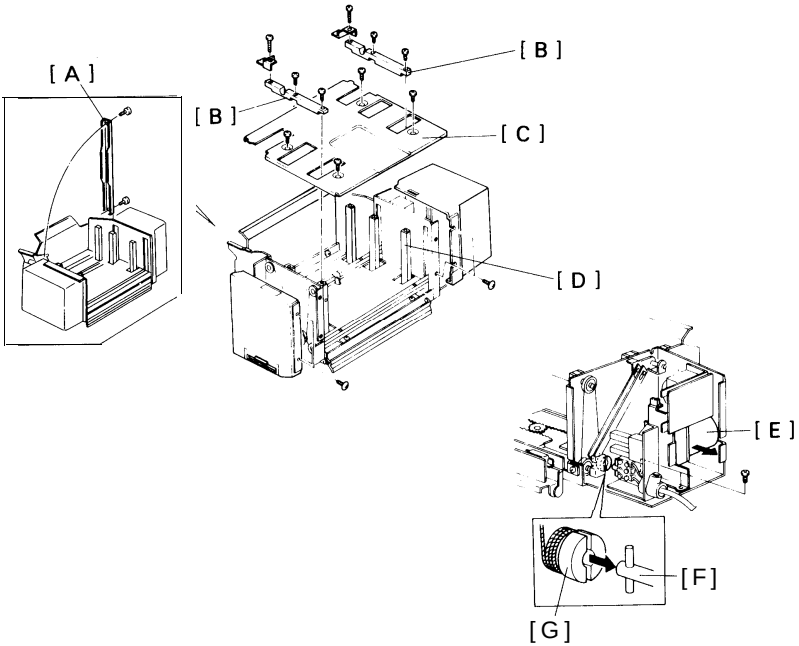


- Common Procedure for Front and Rear Wires -

NOTE: The running directions for the front and rear wires are opposite.

1. Loosen the wire tightener [A] (1 screw).
2. Insert the bead [B] (unmarked) into the rear slot of the drive pulley.
3. Loop the wire around the drive pulley [C], as shown (one and a half turns).
4. Run the wire over WPI, WP2, WP3, and WP4 in turn while also placing the lift rod's ends in the braces.
5. Insert the bead [D] (red) into the other slot of the drive pulley.
6. Loop the wire around the drive pulley, as shown (two and a half turns).
7. Hook the wire on the tightener pulley [E].
8. Move the rods up and down manually to ensure that the drive wire does not overlap on the pulley.
9. Tighten the wire using the tightener (1 screw).
10. Reassemble.

2. **Tray Down Sensor and Positioning Switch Replacement**



1. Open the side cover (1 screw).

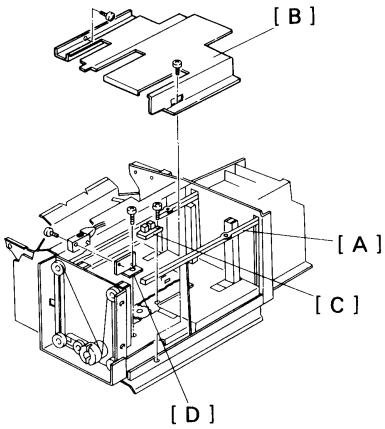
2. Remove the top cover and rear cover (5 screws).

3. Remove the sensor bracket [A] (2 screws). (There is no need to disconnect the sensor connector.)

4. Remove the two post tops [B] (3 screws each).

5. Remove the tray bottom plate [C] (4 screws) taking care **not to damage** the 6 guide posts [D].

6. Move the tray drive motor assembly [E] (2 screws) to the rear to disengage the tray drive shaft [F] from the wire drive pulley [G].



7. Raise the lift rods [A].

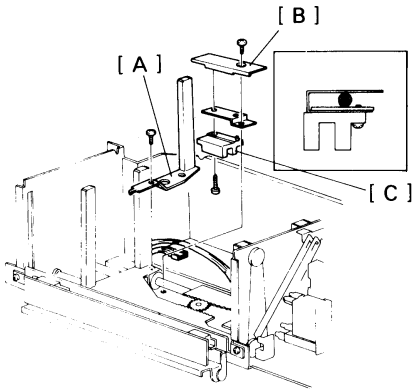
8. Remove the front inner cover [B] (1 short and 1 long screw).

9. Replace the tray down sensor [C] (1 screw and connector).

10. Rotate the paper size dial to a smaller size, such as A4R, and remove the positioning switch bracket [D] (1 screw).

11. Replace the positioning switch (2 screws).

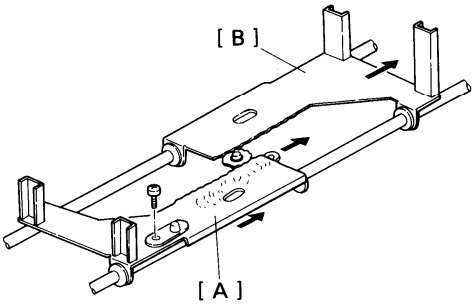
3. **Paper Size Sensor Replacement**



1. Do steps 1 to 8 of the tray down sensor and positioning switch replacement procedure.
2. Remove the front guide post [A] (1 screw and 1 hook).
3. Remove the paper size sensor bracket [B] (1 screw).
4. Replace the paper size sensor [C] (1 screw and 1 connector).

NOTE: When installing the sensor bracket, make sure that the harness is positioned inside the sensor bracket.

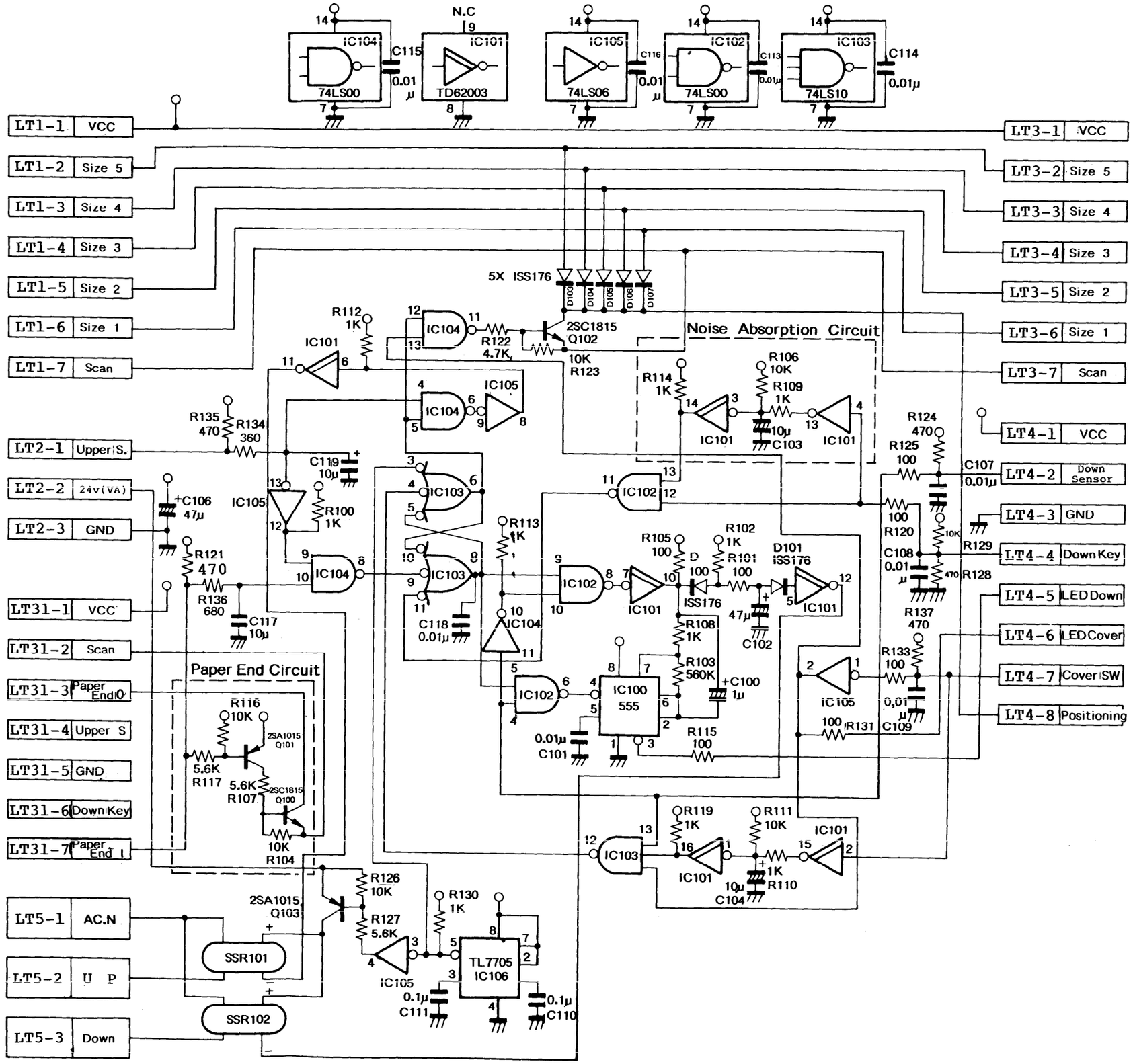
4. **Side Registration Adjustment**



NOTE: Do not move the paper size dial while performing this adjustment.

1. Do steps 1 to 8 of the tray down sensor replacement procedure.
2. Loosen the 2 screws securing the pinion bracket [A].
3. Loosen the screw securing the guide post lock plate [B].
4. Move the pinion bracket while holding the pinion so that the pinion does not turn. (The front and rear guide posts must be equidistant from the center.)
5. Tighten the screws securing the pinion bracket.
6. Tighten the screws securing the guide post lock plates.
7. Confirm that the side registration is adjusted correctly and reassemble.

LCT CONTROL BOARD SCHEMATIC (Main Control)



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SECTION 10

EDITOR BOARD

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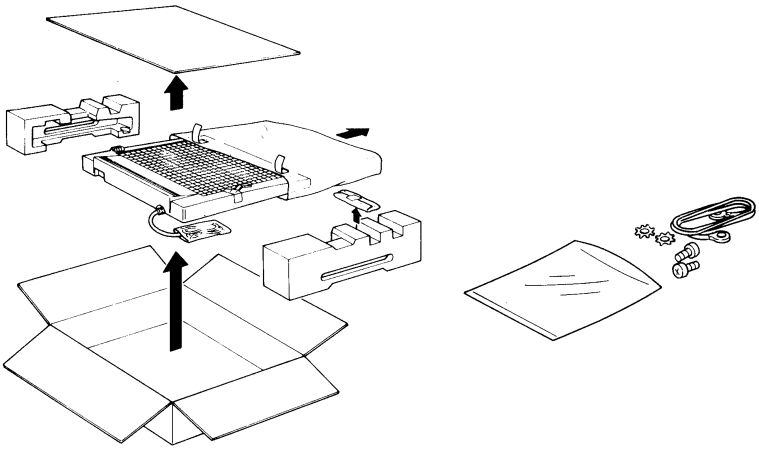
EDITORCONTROL BOARDSCHEMATIC

EDITOR BOARD INSTALLATION

UNPACKING AND INSTALLATION

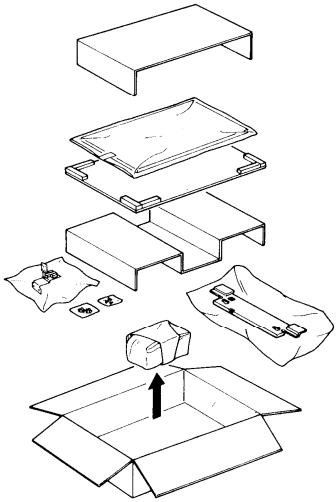
1. Accessory Check



Check the quantity and condition of the accessories in the box according to the following list:

1.	Installation Procedure (115V - English only. 220/240V - Five languages)	1
2.	New Equipment Condition Report	1
3.	NECR Envelope (115V only)	1
4.	Operation Instructions (1 15V - English only. 220/240V - Five languages)	1
5.	stylus	1
6.	Cover Plate (FT4480/FT4430 only)	1
7.	Ferrite Core (European version only)	1
8.	Lock Plate (European version only)	1
9.	Clamp	2
10.	Multilingual Decal (European Version only only)	1
11.	Pan Head Screw (M4 x 8)	1
12.	Ground Screw (European version only)	2
13.	Toothed Washer (European version only)	2
14.	Ground Wire (European version only)	1

2. Installation Set for RE 11

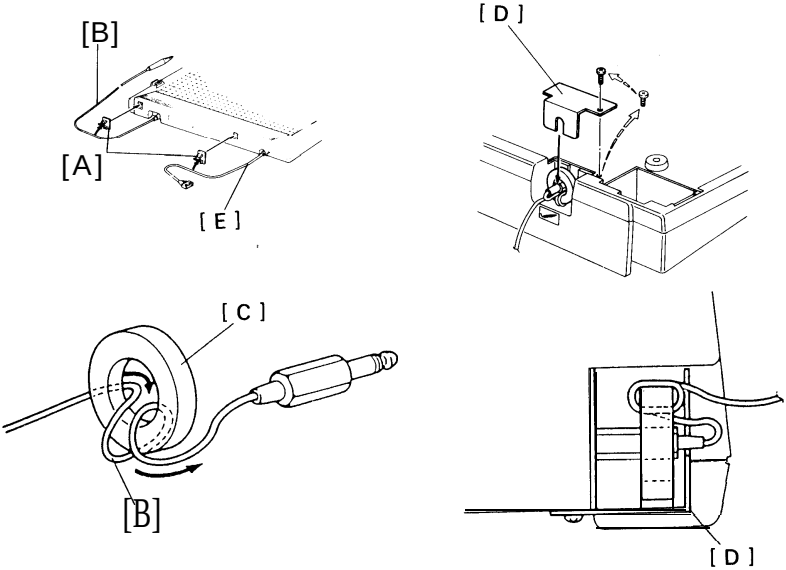


The installation set is required when using the editor as a pressure plate.

Open the box and check the parts according to following list:

1.	Pressure Sheet	1
2.	Left Hinge	1
3.	Right Hinge	1
4.	Pan Head Screw (M4 x 12)	12
5.	Harness Clamp	2
6.	Hinge Bracket (FT5560, - 115V only)	1
7.	Mounting Stud (FT5560, - 115V only)	2
8.	Pan Head Screw with Washer (M3 x 6) (FT5560, -115V only)	2

3. Installation Procedure on a Table



NOTE: This procedure is required if the ADF or platen cover is already installed on the machine.

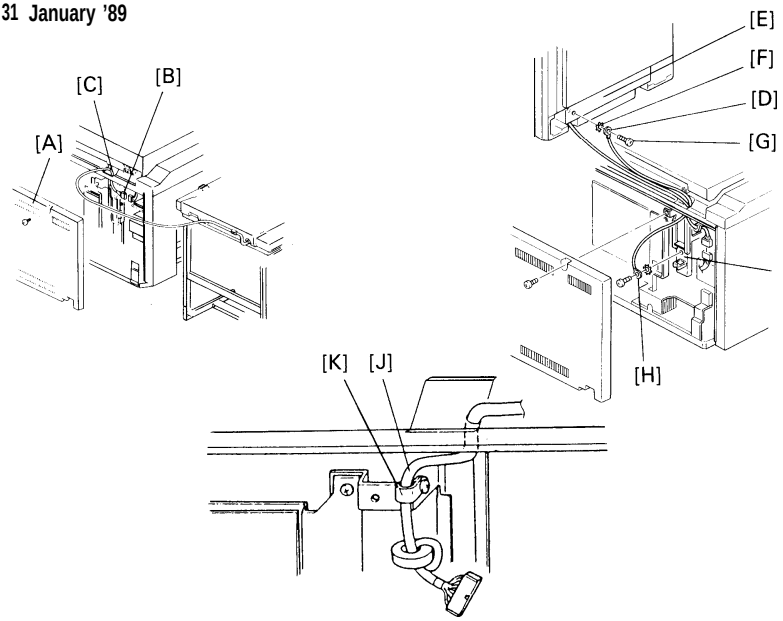
1. Install the clamps [A] on the editor as shown in the figure.
2. Turn the stylus harness [B] twice around the ferrite core [C] as shown in the figure.

NOTE: Step 2 is only required in the European machines.

3. Plug the stylus jack into the editor board as shown.
4. Remove the screw securing the bottom plate as shown and secure the lock plate [D] to the bottom plate.

NOTE: - Step 4 is only required in the European machines.
- Be sure that the lock plate does not damage the stylus harness.

5. Secure the stylus harness and connector harness [E] in the clamps.
6. Place the editor on a table.



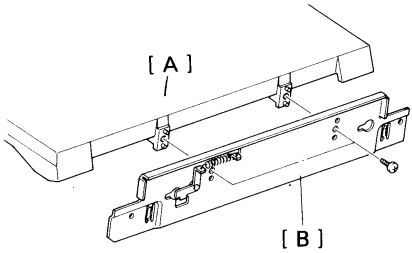
7. Remove the rear cover [A].
8. Connect the editor connector (8 pin) [B] through the docking hole [C] of the DF.

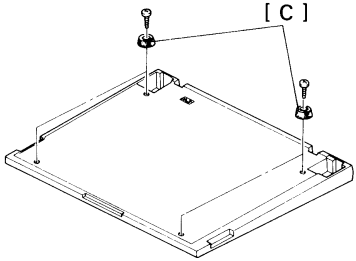
NOTE: - If the platen cover is installed on the machine, the connector should be connected through the cutout in the docking hole cap as shown on page 10-7.

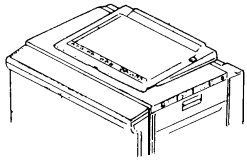
- Steps 9, 10, and 11 are only required in the European machines.

9. Secure the ground wire [D] to the bottom plate [E] of the Editor Board (1 toothed washer [F] and 1 ground screw [G]).
10. Pass the ground wire through the docking hole as shown in the figure.
11. Secure the other end of the ground wire [H] to the DF mounting bracket [1] (1 toothed washer and 1 ground screw).
12. Clamp the editor harness [J] and the ground wire to the main board bracket with the nylon wire clamp [K].
13. Reinstall the rear cover.
14. Check the operation of the editor.
15. Fill out the New Equipment Condition Report.

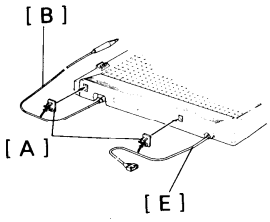
4. **Installation Procedure on the Machine**

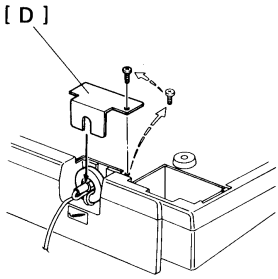


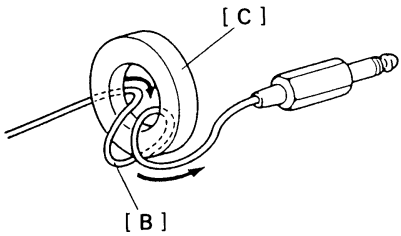


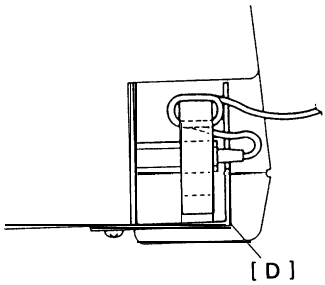


1. Remove the platen cover [A] from the machine.
2. Remove the platen cover hinge bracket [B] from the platen cover.
3. Remove the feet [C] from the editor (4 screws).









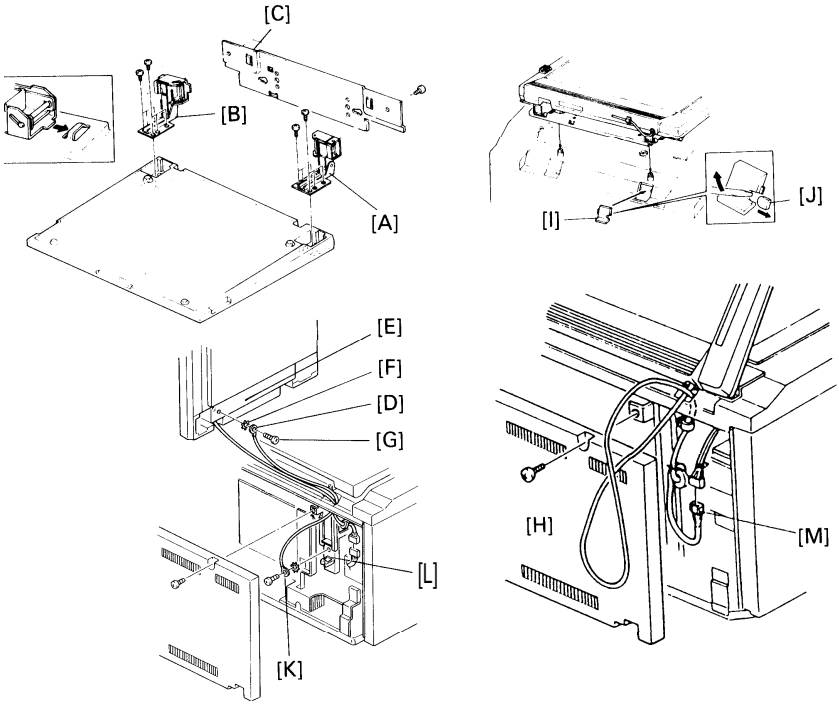
4. Install the clamps [A] on the editor as shown in the figure.
5. Turn the stylus harness [B] twice around the ferrite core [C].

NOTE: Step 5 is only required for European machines.

6. Plug a stylus jack into the editor as shown.
7. Remove the screw securing the bottom plate and secure the lock plate [D] to it.

NOTE: - Step 7 is only required in the European machines.
- Be sure that the lock plate does not damage the stylus harness.

8. Secure the stylus harness and connector harness [E] in the clamps.

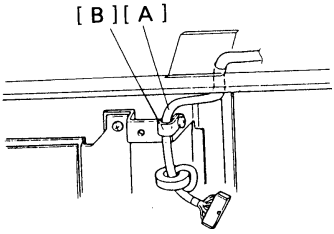


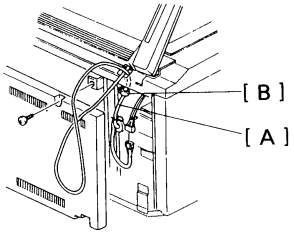
9. Install the left hinge [A] and right hinge [B] on the editor (6 screws each).
10. Install the hinge bracket [C] on the hinges (2 screws).

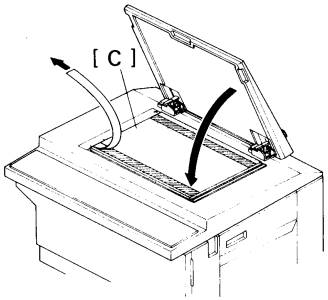
NOTE: - Use the screws which secure the platen cover to the copier.

- Steps 11, 14, and 15 are only required in the European machines.

11. Secure the ground wire [D] to the bottom plate [E] of the Editor Board (1 toothed washer [F] and 1 ground screw [G]).
12. Remove the rear cover [H] and remove the right docking hole cover [1].
13. Remove the cap [J] from the right docking cover using a small screw driver as shown.
14. Pass the ground wire through the docking hole as shown in the figure.
15. Secure the other end of the ground wire [K] to the DF mounting bracket [L] (1 toothed washer and 1 ground screw).
16. Connect the editor connector (8 pin) [M] through the docking hole and reinstall the docking hole cover on the copier.

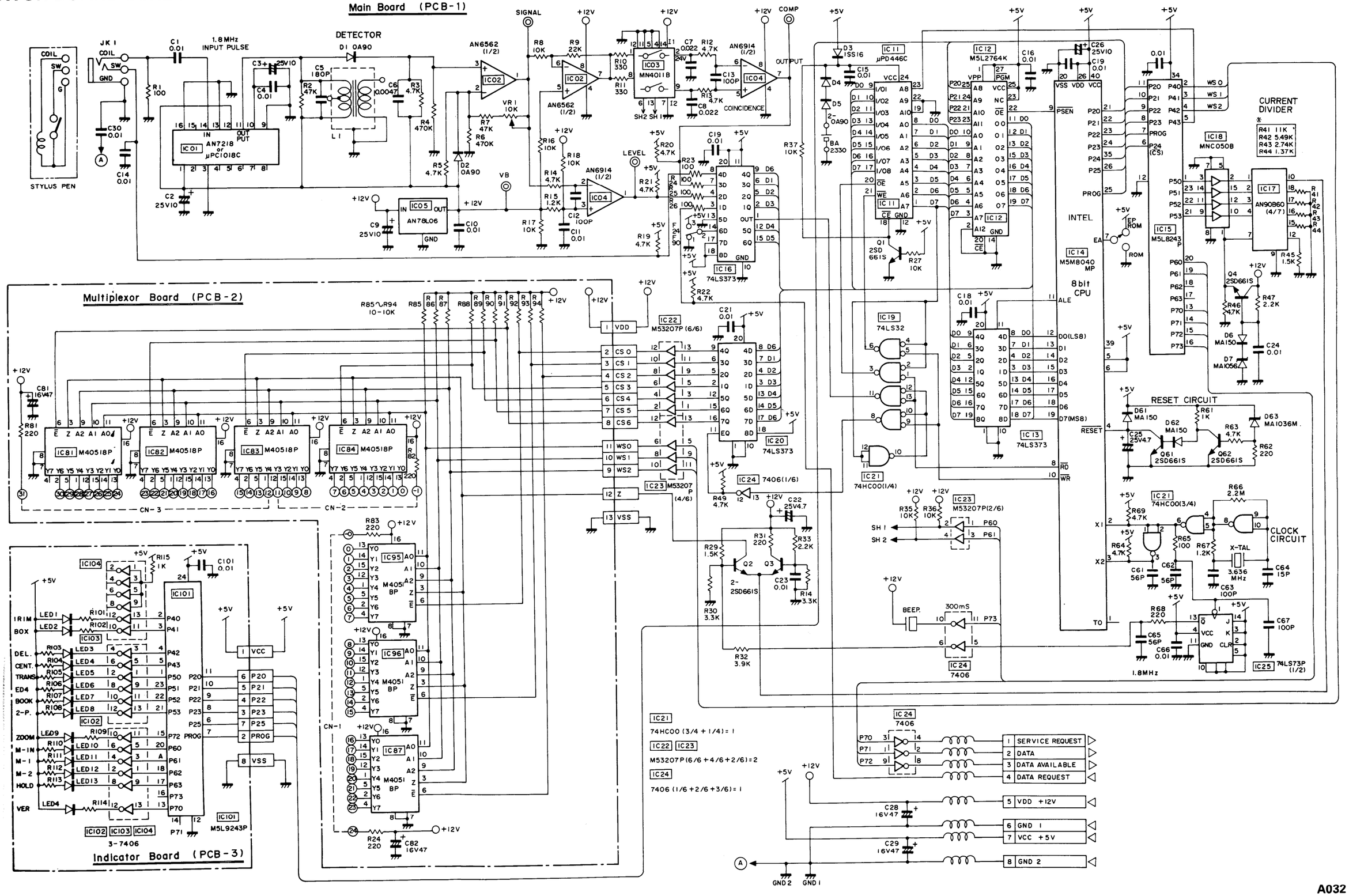






17. Clamp the editor harness [A] to the main board bracket with the nylon wire clamp [B], then reinstall the rear cover.
18. Install the editor on the copier.
19. Put the pressure sheet [C] on the exposure glass so as to align the image area indicators.
20. Remove the seal.
21. Close the editor to complete the installation of the pressure sheet and the editor.
22. Check the operation of the editor.
23. Fill out the New Equipment Condition Report.

EDITOR BOARD SCHEMATIC



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SECTION 11

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COPY QUALITY

WHITE SPOTS

1. Firefly Spots

- Possible Causes -

- Developer too old
- Insufficient toner in developer
- Dirty seals around development unit

- Action -

is there a small black spot in the center of the white spot?

Y N

Y: Check and adjust the doctor gap (0.90 mm).

Is the image density too light?

Y N

Y:
- Clean the ends of the development roller.
- Replace the developer and the side seals.

N: Correct the light copy condition. Refer to the "Light Copy" section.

2. Small Spots

- Possible Causes -

- Dirty corona wire.
- Incorrect corona current

- Action -

Perform drum conditioning. If that does not solve the problem, check whether the charge corona current is correct.

Y N

Y: Adjust the charge corona current.

N: Clean the transfer corona wire and adjust the transfer current.

3. **Dirty Background Around White Spots**

- Possible Causes -

- Condensation on the drum due to rapid temperature change. This phenomenon may occur early on winter mornings.

- **Action -**

The problem should disappear after about 20 copies. if it does not, perform drum conditioning.

HAT IMAGE

- Possible Causes -

- Defective quenching lamp
- Charge corona wire miscounted
- Incorrect corona current
- Old developer

- **Action -**

Does the quenching lamp turn on?
Y N
Does CN203-8 drop from +24 volts to ground?
Y N
▸ Check the connector and harness.
Replace the quenching lamp.

Is the charge corona wire properly installed?
Y N
▸ Install the charge corona wire correctly.
▸ Replace any defective parts.

Is the charge corona current correct?
Y N
Adjust the charge corona current.

Replace the developer.

BLANK AREA OR PATCHY IMAGE

- Possible Causes -

- Uneven pTL, transfer, or separation coronas.

- Action -

Are the PTL, transfer, and separation corona wires improperly installed?
Y N
| |
| Clean the PTL, transfer, and separation corona wires and adjust the corona currents.
|
Clean and reset the wire(s).

UNFUSED COPY

1. Image Can be Easily Rubbed Off

- Possible Causes -

- Thermistor malfunction
- Very low early morning temperatures.
- Copy paper has a very rough surface.

- Action -

Does the problem occur only early in the morning?
Y N
| |
| Is the thermistor dirty or damaged?
| Y N
| | |
| | Increase fusing temperature using SP Mode # 49. If the problem still occurs, increase the fusing pressure.
| |
| Clean or replace the thermistor.
|
Select the fusing idling mode using SP Mode # 29.

JITTER

- Possible Causes -

- Vibration in drive mechanism
- Scanner not moving smoothly

- Action -

Does jitter appear on the leading edge of copies?

Y — N

Does the interval of jitter change when making reduced copies?

Y — N

Check the main drive belt. Replace the tensioner spring if it is stretched.

Clean the scanner guide rods; then, apply a small amount of Launa oil to the lubricant pad (if dry).

Is the scanner wire tension correct?

Y — N

Rehook the tension spring or replace it if stretched.

Check all mechanical parts for incorrect operation.

HOLLOWING OUT

1. Center of Solid Black Areas is Hollow

- Possible Causes -

- Damp paper
- incorrect transfer or separation corona current.

- Action -

is the paper damp?

Y N

N: ▸ Clean the PTL and T/S corona wires.

N: ▸ Check and adjust the transfer and separation corona currents.

Y: Replace the damp paper with fresh paper.

VERTICAL WHITE LINES OR BANDS

1. Lines 80 mm Apart

- Possible Causes -

- Damaged pick-off pawls
- Pick-off mechanism malfunction

- Action -

Does the pick-off pawl mechanism work correctly?

Y N

N: Correct or replace any defective parts.

Are the pick-off pawls damaged?

Y N

N: Replace the drum

Y: Correct or replace the pick-off pawls, and replace the drum.

2. **Straight Sharp Lines**

- Possible Causes -

- Drum scratched
- Cleaning blade damaged
- Cleaning brush worn
- Hot roller scratched
- Hot roller strippers worn

- Action -

Start a copy cycle and stop it before the copy reaches the fusing unit.

Do the same lines exist on the unfused copy?

Y N

If the surface of the hot roller is scratched, which part is scratching the hot roller surface?

- ▸ Oil Blade
- ▸ Hot Roller Strippers
- ▸ Other

Clean, correct, and/or replace any parts which scratch the hot roller. If the hot roller strippers are badly stained with toner, check and adjust the fusing temperature. Then, replace the hot roller.

Is the drum scratched?

Y N

Follow troubleshooting section "Uneven Density 1) Uneven density appears in bands. "

Correct or replace any parts scratching the drum surface.

- ▸ Cleaning entrance seal--wavy, bent, burrs
- ▸ Cleaning brush
- ➤ Brush seals which contact the drum

Are there any foreign substances around the drum that may cause leaking of the drum potential?

Y N

- ➤ Clean the edge of the cleaning blade. Check that the movement of the blade cleaner is smooth and that the cleaner edge is straight.
- ➤ Clean all seals.

Remove the foreign substances.

3. **Fuzzy Lines or Bands**

- Possible Causes -

- Dirty corona wire

- Action -

Clean the charge, transfer corona wires, and PTL.

UNEVEN DENSIN

1. Image Density Gradually Changes Across The Copy

- Possible Causes -

- Charge corona wire height not even
- Charge corona wire dirty
- Doctor gap not even

- Action -

Does the darker area follow the image when making reduced copies?

Y — Clean the charge corona wires. Are the charge corona wires incorrectly positioned in the wire cleaner and end block?

Y — Is the charge corona current uneven across the drum?

Y — Clean the transfer corona unit.

N — Adjust the charge corona current and wire height.

N — Position the wires correctly.

N — If the problem still exists, check and adjust the doctor gap.

Are any of the optics parts stained?

- Toner Shield Glass
- Exposure Glass
- Mirrors, Lens, Reflectors

Y

N

Is the exposure lamp stained black?
Y N
Correct uneven exposure using the adjusting plates.
Replace the exposure lamp.
Clean them.

2. **Uneven Density Appears in Bands.**

- Possible Causes -

- Exposure lamp misaligned
- Dirty quenching lamp
- Dirty corona wire
- Incorrect corona current

- Action -

Does the darker area move with the image when making reduced copies?
Y N
- ▸ Clean the charge corona wire.
- ▸ Check and adjust the charge corona current. Make sure it is even across the drum.
- ▸ Clean the quenching lamp.
- ▸ Clean the transfer corona wire.
- ▸ Clean the erase unit.

Are any of the following parts stained or dirty?
- ➤ Toner Shield Glass
- ➤ Exposure Glass
- ➤ Mirrors, Lens, Reflectors

Y N
Is the exposure lamp stained?
Y N
Correct using the adjusting plates. Does the problem still exist?
Y
Align the filament of the exposure lamp.
Replace the exposure lamp.
Clean them.

ABNORMAL IMAGE DENSITY

1. Image Density Is **Too High Or Too Low**

- Possible Causes -

- Incorrect charge corona current
- ID sensor malfunction

- Action -

Check the output voltage of the ID sensor using SP Mode # 54. Is the voltage correct?

Y N

Y: Check and adjust the charge corona current.

N: Adjust the voltage so that it is within standard.

If the image density is too light, use SP Mode # 60 to supply toner.

VERTICAL BLACK LINES OR BANDS

1. Wavy Lines

- Possible Causes -

- Dust **between** the cleaning blade and drum
- Edge of the cleaning blade deformed
- Insufficient cleaning pressure
- Cleaning mechanism not working properly

- Action -

Clean the edge of the cleaning blade. Do the lines still exist or do they reappear after a short time?

Y: Is the stroke of the cleaning solenoid plunger 4 mm?

Y N

N: Adjust the stroke of the cleaning solenoid.

Check the cleaning pressure mechanism. Do all parts move properly?

Y N

Correct or replace any defective parts and check operation again.

Is the edge of the cleaning blade deformed?

Y N

Slightly increase the cleaning pressure.

Replace the cleaning blade.

2. **Dotted Lines or Bands**

- Possible Causes -

- pick-off pawl mechanism malfunction
- Scratched drum

- Action -

Do the pick-off pawls swing properly?

Y N

Correct or replace the pick-off pawls, and replace the drum.

Is the gap between the drum and pick-off pawls correct (1.5 ± 1 mm)?

Y N

- If the pick-off pawl mechanism does not work properly, correct or replace any defective parts.
- If the drum is scratched, correct the condition that caused the scratch; then, replace the drum.

Are the pick-off pawls locked by toner or dust?

N Y

Clean the pawl shaft and pick-off pawls using alcohol and lubricate with Launa oil.

Are the pawl springs defective?

Y

Replace the springs.

3. **Line or Band Appears at The Rear Edge of The Copy (A3 or 11" x 17")**

- Possible Cause -

- Toner shield glass mismounted

- **Action -**

Set the toner shield glass properly.

4. **Straight Lines Or Bands**

- Possible Causes -

- Hot roller scratched
- Insufficient silicone oil
- Cleaning blade damaged
- Drum scratched

- **Action -**

Do the lines move with the image when making reduced copies?

Y N

Start a copy cycle and stop it just before the paper reaches the fusing unit. Then, check if the unused copy has the same lines on it.

Y N

If the hot roller surface is scratched, clean, correct, or replace any parts scratching the surface.

- Oil Blade
- Hot Roller Strippers

Note: If the hot roller strippers are badly toner stained, check and adjust the fusing temperature. Replace the hot roller. Check the silicone oil level.

Is the drum scratched?

Y N

If you cannot solve the problem by following troubleshooting "Uneven Density 2. Uneven density appears in bands", clean the edge of the cleaning blade. Make sure the blade cleaner moves smoothly, and that the cleaner edge is straight.

Determine what scratched the drum and correct it (perhaps the pick-off pawls), and replace the drum.

Refer to "Vertical White Lines 2) Straight sharp line(s)".

5. Lines at Irregular Intervals

- Possible Causes -

- Deformed cleaning blade scraper
- Toner clogged in cleaning unit

- Action -

Is toner clogged in the cleaning unit?

Y — Clean the cleaning unit. Check the toner collection coil; replace it if damaged.
- Check RA3. Make sure the cooling fan operates properly.

N — Check the cleaning blade scraper.
- Is it straight?
- Does it contact the cleaning blade properly?
- Does it move correctly?

Y — Correct or replace any defective parts.

N

BLACK SPOTS AT THE LEADING EDGE

- Possible Cause -

- Separation corona wire mismounted

- Action -

Is the separation corona wire properly installed?

Y — If the separation corona current is incorrect, clean the separation corona wire and adjust the separation corona current.

N — Clean the separation corona wire and T/S corona unit.

DIRTY BACKGROUND

1. Dirty Background on Entire Copy image

- Possible Causes -

- Dirty corona wire
- Toner supply clutch malfunction
- Incorrect lamp regulator output
- Dirty drum and bias thermistors
- Inefficient drum cleaning
- Incorrect corona current
- Drum worn out

- Action -

Note: When the problem occurs after the drum conditioning, make several white copies or cycle the development unit for 2 minutes using free run.

Make a reduced copy with A3/11" x 17" paper. Does the dirty background appear in the erased areas?

Y

- ▸ Clean the drum thermistor and bias thermistor surfaces.
- ▸ Clean the charge corona wire.
- ▸ Clean the optics.

If the problem was not resolved, adjust the lamp regulator output.

If the problem still exists, check and adjust the charge corona current.

N

▸ Clean the erase unit.

➤ Clean the drum heater thermistor and bias thermistor surfaces.

Do wavy lines occur with the dirty background?

Y

Does the toner supply clutch turn off?

Y

Is CN230-4 high?

Y

Check/replace the main board.

N

Clean or replace the toner supply clutch.

N

- Check and adjust the charge corona current.
- Clean or replace the cleaning brush.

- Clean the edge of the cleaning blade.
- Check that the edge of the blade scraper is straight and that its movement is smooth. If not, correct or replace any defective parts.

If the problem still exists, one of the following should solve it:

- Replace the cleaning blade.
- Check the quenching lamp; replace if necessary.
- Replace the drum.

BLANK COPY

- Possible Causes -

- Charge corona wire miscounted or broken
- Defective power pack
- Defective main board

- Action -

Is there a faint image?

Y

N

Is the charge corona wire (or unit) incorrectly installed?

Y

N

Does the main board output the correct signal to the power pack (CN206-A22 drops from +24 volts to ground)?

Y

N

Replace the main board.

- Clean the charge corona unit and remove any foreign substances that might cause a leak.
- If the problem still exists, replace the charge power pack.

Reset the charge corona wire (or unit).

Does the density gradually drop when making copies?

Y

N

Is the transfer corona wire (unit) incorrectly installed?

Y

N

Does the main board output the proper T/S trigger signals?

Y

N

Replace the main board.

Replace the transfer corona power pack.

Reset the transfer corona wire (unit).

Check the development drive mechanism and clean or replace any defective parts.

LIGHT COPY

- Possible Causes -

- Development bias not applied or defective bias power pack
- Defective main board
- Defective dc power supply

- Action -

Does the image density change with ID selection?

Y — Is the development bias applied?

Y — Does the bias power pack receive the proper trigger signal from the main board?

Y — Replace the main board.

N — Check for electrical continuity between the bias terminal and the development sleeve. Correct any poor contact or faulty wiring. If that isn't effective, replace the bias power pack.

N — Does the toner supply clutch work properly?

Y — Does CN230-4 drop from +24 volts to ground?

Y — Does CN202-A7 go from +24 volts to ground?

Y — Replace the main board.

N — Replace the paper feed relay board.

N — Clean or replace the toner supply clutch.

Other possible causes:

1. Charge corona
2. Transfer corona
3. Development drive mechanism

PAPER CREASING

- Possible Causes -

- If thin copy paper is used, the leading edge may not set correctly between the fusing rollers, resulting in creased copies.
- Paper curl

- Action -

Is thin paper used frequently?
Y N
| |
| Move the fusing entrance guide to the upper position.

If the paper is curled, reduce the fusing pressure. If this does not solve the creasing problem, instruct the customer to correct the paper curl before copying.

MULTIFEED AND MISFEED

- **Possible Causes -**

- Incorrect friction between the feed pad and feed roller.
- Very thin or very thick paper is being used.

- **Action -**

Is the gap between the friction pad and feed roller 1.6 ± 0.3 mm?
Y N
|
| Adjust the friction pad/feed roller gap.

Do the feed problems occur mostly with the cassette tray?
Y N
| |
| ➤ If multifeeds are common, decrease the friction pad/feed roller gap slightly to increase feed friction.
| ➤ If misfeeds (feed failure) are common, increase the friction pad/feed roller gap slightly to decrease feed friction.
| ➤ If the customer uses special paper frequently, adjust the friction at one feed station to match the special paper. Instruct the user to use only that station to copy the special paper.

Adjust the friction pad holder position.

If the above measures do not solve the problem, replace the feed roller and friction pad.

SERVICE CALL CONDITIONS

11 EXPOSURE LAMP MALFUNCTION

- Possible Causes -

- Exposure lamp turns on while in standby condition.
- Exposure lamp circuit open (lamp filament broken).
- Cooling fan malfunction.

- Action -

Does the cooling fan work?

Y: Check the cooling fan circuit. Replace the cooling fan if it is defective.

N:

Turn the main switch off and on. Does SC 11 remain off?

Y:
- Replace the thermostat if the thermostat is open.
- Replace the exposure lamp if the exposure lamp circuit is open.
- Replace the lamp regulator if the exposure lamp circuit is not open.

N:

Press the Start key. Does lamp trigger (CN204-3) go from +24 V to 0 V?

Y: Replace the main board.

N: Replace the lamp regulator.

21 SCANNER HOME POSITION SENSOR NOTON

- Possible Causes -

- Scanner does not move to home position at power on.
- Home position sensor failure.

- Action -

Move the scanner away from the home position. Turn the main switch off and on. Does the scanner move to the home position.

Y N

Y: Manually activate the home position sensor. Does CN101 -B7 go from LOW to HIGH?

N: Check/repair the scanner drive mechanism.

Y N

Y: Replace the main board.

N: Replace the home position sensor.

23 NO REGISTRATION START SIGNAL

- Possible Causes -

- Optics control circuit failure (no registration signal)

- Action -

Replace the main board. If the problem still exists, check the scanner drive motor.

24 NO SCANNER HOME POSITION SIGNAL

- Possible Causes -

- Scanner does not return to home position within 20 seconds after scanner start.
- Optics control circuit failure.
- Scanner home position sensor failure.

- Action -

Does the scanner return to the home position within **20** seconds after scanning starts?

Y N

Y: Check/repair the scanner drive mechanism.

Does CN101-B7 stay HIGH when the scanner leaves the home position?

Y N

N: Replace the main board.

Check the scanner home position sensor circuit. Replace the scanner home position sensor if necessary.

28 LENS HOME POSITION SENSOR NOT ON

- Possible Causes -

- Lens does not move properly.
- Lens home position sensor failure.

- Action -

Does the lens move smoothly?
Y N
| |
| Check/repair the lens drive mechanism.
|

Test the lens home position sensor. (Does CN101 -B3 stay LOW?) Replace it if defective.

if the above does not work, replace the main board.

29 LENS HOME POSITION SENSOR NOT OFF

- Possible Causes -

- Lens does not move properly.
- Lens home position sensor failure.

- Action -

Does the lens move smoothly?
Y N
|
Check/repair the lens drive mechanism.

Test the lens home position sensor. (Does CN101-B3 stay HIGH?) Replace it if defective.

If the above does not work, replace the main board.

2A 2ND SCANNER HOME POSITION SENSOR NOT ON

- Possible Causes -

- Second scanner drive doesn't work properly,
- Second scanner home position sensor failure.

- Action -

Check the action of the second scanner drive mechanism. Does it move correctly?

Y N

| Check/repair the drive mechanism.

Test the 2nd scanner home position sensor. (Does CN1O1 -B4 stay LOW?) Replace it if defective.

If the above does not work, replace the main board.

2B 2ND SCANNER HOME POSITION SENSOR NOT OFF

- Possible Causes -

- Second scanner drive doesn't work properly.
- Second scanner home position sensor failure.

- Action -

Check the action of the second scanner drive mechanism. Does it move correctly?

Y N

| Check/repair the lens drive mechanism.

Test the 2nd scanner home position sensor. (Does CN101-B4 stay HIGH?) Replace it if defective.

If the above does not work, replace the main board.

2C SCANNER MOTOR TOO FAST

- Possible Causes -

- Scanner motor control circuit failure.

- Action -

Replace the main board.

2D SCANNER MOTOR TOO SLOW

- Possible Causes -

- Scanner motor control circuit failure.

- Action -

Replace the main board.

31 DRUM THERMISTOR

- Possible Causes -

- Drum thermistor circuit open.
- Drum thermistor circuit short.

- Action -

Is the input at CN203-17 less than 0.14 volts?

Y: Replace the erase unit.

N: Is the input at CN203-17 about 5 volts?

Y: Replace the main board.

N: Replace the main board.

32 IMAGE DENSITY SENSOR

- Possible Causes -

- PTL not set.
- Dirty ID sensor.
- ID sensor circuit failure.

- Action -

Clean the ID sensor and reset the PTL unit.
Adjust Vsg using VR201 on the main board. Vsg should be 4.0 ± 0.2 volts.

If the problem still exists, check the input at CN203-5. Is it less than 1.0 volt?
Y N
| |
| Replace the PTL unit.
|
Replace the main board.

41 3RD CASSETTE TRAY LIFT MOTOR

- Possible Causes -

- Lift motor stays on longer than 20 seconds.

- Action -

Is CN228-5 +5 volts when the cassette tray lift sensor is activated?
Y N
| |
| Check the lift sensor circuit. Replace the lift sensor if necessary.
|
Is CN202-B11 + 5 volts when the cassette tray lift sensor is activated?
Y N
| |
| Check whether CN202 and CN220 are connected properly. If they are, replace the paper feed relay board.

Replace the main board.

53 FUSING THERMISTOR ABNORMAL

- Possible Causes -

Thermistor failure, (The input at CN206-B1 is less than 0.5 V.)

- Action -

- Replace the fusing thermistor.

54 FUSING WARM-UP FAILURE

- Possible Causes -

- Fusing lamp blown.
- Thermistor circuit open.

- Action -

SC 54 turns on if the hot roller does not reach 150°C within 8 minutes after the power relay turns on.

Is the fusing lamp filament broken?
Y N
| |
| Is the thermistor circuit open?
| Y N
| | |
| | Check the thermistor. Make sure it is mounted properly and in good contact with the hot roller.
| |
| Replace the thermistor.
|
Replace the fusing lamp.

55 FUSING OVERHEAT

- Possible Causes -

- Thermistor failure (CN206-B1 < 0.5 V).

- Action -

Replace the thermistor.

56 FUSING TEMPERATURE TOO LOW

- Possible Causes -

- Fusing lamp blown.
- Thermistor failure.

- Action -

SC 56 turns on if the hot roller temperature drops below 150°C after warmup is complete.

Is the fusing lamp blown?
Y N
| |
| Replace the thermistor.
|
Replace the fusing lamp.

61 PULSE GENERATOR ABNORMAL

- Possible Causes -

- Main **drive** malfunction.
- Pulse generator sensor failure.

- Action -

SC 61 lights if the main board does not receive a pulse at CN206-A9 for longer than 1.8 seconds.

Is the main drive mechanism working properly?
Y N
| |
| Check/repair all parts of the main drive mechanism. (Motor, timing belt, etc.)
|
Repair or replace the pulse generator.

91 TOTAL COUNTER MALFUNCTION

- Possible Causes -

- Total counter does not cycle.

- Action -

Is +5 V supplied at CN103-5?
Y N

Replace the operation panel.

Is +24 V supplied at CNI03-4?
Y N

Is there +24 V at CN103-3 of the main board?
Y N

Check the Vaa power supply. Replace the dc power supply if it is not correct. Replace the main board if Vaa is all right.

Replace the operation panel.

Does CN103-5 pulse from +5 V to 0 V at the start of the copy cycle?
Y N

Replace the total counter.

Replace the operation panel. If the problem still exists, reinstall the operation panel and replace the main board.

93 OPTICS < = > MAIN COMMUNICATION FAILURE

- Possible Causes -

- Data communication error between the main control circuit and the optics control circuit.

- Action -

Replace the main board.

ID SENSOR ABNORMAL (no SC number)

- Possible Causes -

- Dirty ID sensor or ID sensor failure.

- Action -

If Vsg becomes less than 2.5 volts, the SC indicator lights but no number is displayed. The copier shifts to fixed toner supply mode.

Clean the ID sensor.

If the problem still exists, replace the PTL unit.

If the problem still exists, the ID control circuit must be bad; so, replace the main board.

DEFECTIVE SENSOR TABLE

No.	Name	Condition	Problem
S1	Lens Home Position	Open	Lights SC NO. 29 when the main switch is turned on.
		Short	Lights SC No. 28 when the main switch is turned on.
S2	Pulse Generator	Open	Lights SC No. 61 during the copy cycle.
		Short	Same as "Open" condition.
S3	Toner End	Open	The CPU never detects toner end condition.
		Short	Lights "Add Toner" indicator even when enough toner is present.
S4	Manual Feed	Open	Lights "Manual Feed" indicator even when the manual feed table is closed.
		Short	Never lights "Manual Feed" indicator and the manual feed mode does not work.
S5	Color Toner	Open	"Color Toner" does not turn on when there is a color development unit in the machine.
		Short	Lights "Color Toner" indicator when the main switch is turned on.
S6	First Paper End	Open	Lights "Load Paper" indicator even when paper is present.
		Short	Never lights "Load Paper" indicator even when paper is present.
S7	Second Paper End	Open	Same as S6.
		Short	Same as S6.
S8	First Paper Size	Open	Displays incorrect paper size.
		Short	No cassette in place condition is detected if all sensors are shorted.
S9	Second Paper Size	Open	Same as S8.
		Short	Same as S8.

No.	Name	Condition	Problem
S1	O Registration	Open	Paper always jams at the registration roller.
		Short	Lights "Check Paper Path" indicator when the main switch is turned on.
S11	Paper Exit	Open	Lights "Check Paper Path" indicator when the main switch is turned on.
		Short	"Check Paper Path" indicator lights 1,010 pulses after pressing the Start key (ON check timing).
S12	Second Scanner Home Position	Open	Lights SC No. 2B 3 seconds after the main switch is turned on.
		Short	Lights SC No. 2A 0.3 seconds after the second scanner motor is turned on.
S13	Scanner Home Position	Open	Lights SC No. 21 when the main switch is turned on.
		Short	Lights SC No. 24 when the main switch is turned on.
S14	Toner Overflow	Open	Never detects used toner bottle full condition.
		Short	Lights "Used Toner Bottle" indicator even when the used toner bottle is in full condition.
S15	Oil End	Open	Never detects low oil condition.
		Short	Lights "Add Oil" indicator even when there is enough oil.
S16	Third Paper End	Open	Same as S6.
		Short	Same as S6.
S17	Third Paper Size	Open	Same as S8.
		Short	Same as S8.

No.	Name	Condition	Problem
S21	Cassette Tray Lift	Open	The lift motor turns counterclockwise for about 4 seconds and stops.
		Short	The lift motor turns counterclockwise and SC41 is indicated on the operation panel about 20 seconds after pressing the Start key.
S22	Cassette Tray	Open	Never lights "Paper Size" indicator even when the cassette tray is installed.
		Short	Lights "Paper Size" indicator even when the cassette tray is not installed.